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BRITISH JOURNAL

Photographic Almanac

1932



64 Gravure Pictures

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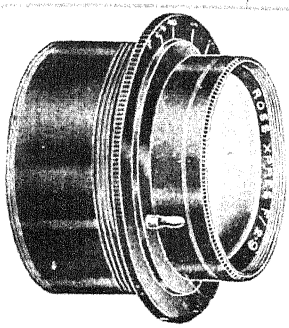
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31684

THE ROSS XPRES LENS

These lenses are the finest example of modern most ultra rapid lenses. Cinematograph, Reflex, Focal Plane and Press Photographers will find them invaluable. A distinctive feature of F 3.5 lens is its wide angle of view.

1.10.3

B.J.P.A.

PRICES.

ROSS XPRES LENS, *f* 1.9

Equiv. Focus		Plate Covered	Flange Size	In Iris Setting	Code Word Iris Setting	Flange Size	In Focussing Jacket	Code Word Focussing Mounts
mm.	in.	mm.	in.	£ s. d.		in.	£ s. d.	
25	1	16 x 12	1¼	10 0 0	Yeda	1⅝	11 0 0	Yedafo
		in.						
38	1½	1 x ¾	1½	10 10 0	Yefe	1⅝	12 0 0	Yefefo
50	2	1 x 1	1¾	11 0 0	Yegi	1⅝	12 15 0	Yegifo
75	3	2⅜ x 1⅝	2	13 0 0	Yeho	2⅛	15 0 0	Yehofo

ROSS XPRES LENS, *f* 2.9

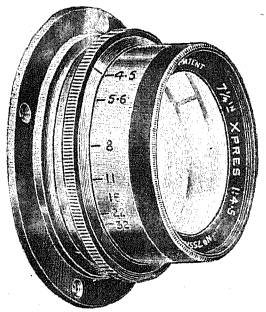
Equiv. Focus		Plate Covered	Price Iris or Sunk Setting	Code Word Iris Setting	Price in Focussing Mounts	Code Word Focussing Mounts
mm.	in.	in.	£ s. d.		£ s. d.	
25	1	16 x 12 mm.	8 10 0	Zuabo	—	—
50	2	1 x ¾	9 0 0	Zuace	10 10 0	Zuaec
62	2½	1 x 1	9 15 0	Zuadi	11 5 0	Zuaid
75	3	2¼ x 1⅝	10 10 0	Zuafo	12 0 0	Zuaof
144	5½	3¼ x 2½ & 4¼ x 3¼	15 10 0	Zubal	18 0 0	Zubla
165	6½	4¼ x 3¼ & 5 x 4	17 10 0	Zucem	21 0 0	Zucme
215	8½	5 x 4 & 6½ x 4¾	25 0 0	Zudin	—	—
254	10	6½ x 4¾	35 0 0	Zufop	—	—

ROSS XPRES LENS, *f* 3.5

Equiv. Focus		Plate Covered	Price in Iris or Sunk Setting	Code Word Iris Setting	Price in Focussing Mounts	Code Word Focussing Mounts
mm.	in.	in.	£ s. d.		£ s. d.	
38	1½	1 x ¾	6 10 0	Zabse	7 12 6	Zebune
50	2	1 x 1	6 10 0	Zenar	7 12 6	Zecto
75	3	1¾ x 1	7 10 0	Zecuno	8 12 6	Zoton
90	3½	2¼ x 1⅝	8 0 0	Zecupa	9 10 0	Zotup
100	4	2½ x 1¾	9 0 0	Zedan	11 0 0	Zedna
112	4½	3¼ x 2½	10 0 0	Zefep	12 5 0	Zefpe
136	5⅜	4¼ x 3¼	11 10 0	Zegir	13 15 0	Zegsi
152	6	4¼ x 3¼	12 15 0	Zehos	15 5 0	Zehfto
165	6½	5 x 4	14 0 0	Zejut		
184	7¼	5¼ x 3¾	16 0 0	Zekav		
254	10	6½ x 4¾	30 0 0	Zelew		

In sunk settings for Reflex Cameras at same price as ordinary mounts.
The Special Focussing Mounts are for Hand Cameras of fixed extension.
They do not admit of between-lens Shutters.
Cost of pairing lenses for Stereoscopic work, 15/-.

ROSS LTD. **CLAPHAM COMMON** **LONDON, S.W4**



THE ROSS XPRES LENS

The Ross Xpres F/4.5 lens combines extreme speed with a quality of definition unequalled in lenses of the same aperture. Its critical definition at full aperture is maintained over the whole of the plate. Faults usually associated with similar lenses such as Ghost, Flare and Coma are totally absent.

PRICES.

ROSS XPRES LENS, *f*/4.5

Equiv. Focus mm.	Equiv. Focus in.	Plate Covered	Price in Iris or Sunk Setting £ s. d.	Code Word Iris Setting	Price in Focussing Mounts £ s. d.	Code Word Focussing Mounts
75	3	2 5/16 x 1 3/4	6 5 0	Xasal		
90	3½	3¼ x 2¼	6 5 0	Xama		
105	4⅛	3¼ x 2½	7 0 0	Xanaf		
112	4⅜	3⅜ x 2⅝	7 0 0	Xapel	8 15 0	Xeptre
120	4¾	3½ x 2¾	7 0 0	Xalas	8 15 0	Xartra
127	5	4 x 3	7 10 0	Xaqes		
136	5⅜	4¼ x 3¼	7 10 0	Xeros	9 10 0	Xestree
140	5½	4¼ x 3¼	7 10 0	Xemes	9 10 0	Xemtred
152	6	5 x 4	8 10 0	Xines	10 15 0	Xintrop
165	6½	5½ x 3½	10 0 0	Xopos	12 5 0	Xoptemp
184	7¼	6½ x 4⅝	11 0 0	Xugus	13 10 0	Xuqtrowp
215	8½	7 x 5	14 10 0	Xares		
254	10	8 x 5	20 0 0	Xesis		
305	12	8¼ x 6½	29 0 0	Xitos		
360	14	10 x 8	40 0 0	Xusic		
420	16½	10 x 8	50 0 0	Xovus		
533	21	12 x 10	75 0 0	Xuras		

In sunk settings for Reflex Cameras at same price as ordinary mounts.
The Special Focussing Mounts are for Hand Cameras of fixed extension.
They do not admit of between-lens Shutters.
Cost of pairing lenses for Stereoscopic work, 15/-.

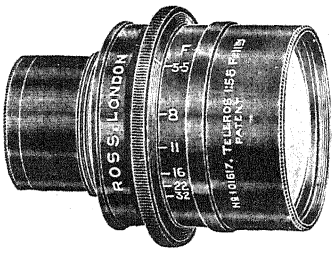
THE *f*/4 WIDE ANGLE ROSS XPRES LENS.

The angle embraced by this lens is 80° and the definition is maintained from centre to margin at full aperture. Designed for special aerial surveying, it is eminently suitable for all classes of work where critical definition, together with large aperture and great covering power are required.

Equiv. Focus	Plate Covered at Full Aperture	Price £ s. d.	Code Word Iris Setting	Code Word In Special Mounts with Long Screw threads and Clamping Flanges
in.	in.			
5	5 x 4 or 6½ x 4¾	14 0 0	Wafs	Wafaf
6	6½ x 4¾ or 8 x 5	15 10 0	Wags	Wagaf
7	7 x 7 or 8 x 5	21 0 0	Wais	Waaf
8¼	9 x 7	24 10 0	Wals	Walaf
10	10 x 8	33 0 0	Wams	Wamaf
12	12 x 10	46 0 0	Waps	Wapaf
14	15 x 12	67 0 0	Wars	Waraf
20	22 x 18	125 0 0	Wass	Wasaf

ROSS LTD **CLAPHAM COMMON** **LONDON, S.W.4**

THE ROSS TELEROS LENSES



These lenses can definitely be claimed to be the finest of their type. The Teleros F/5.5 (Two Power) and F/6.3 (Three Power) give an image rather more than twice or three times as large respectively as that of an ordinary lens from the same viewpoint. Giving critical definition they are perfect for high speed photography of inaccessible objects and those difficult to approach.

PRICES.

ROSS TELEROS LENS, *f*/5.5
(Two Power)

Equiv. Focus	Size Plate	Flange Inside dia.	Length Over-all	Infinity Back Cell to Screen	Back Cell to Flange	Price in Iris Setting	Code Word
6¼ in.	2 5/16 x 1 3/4	1 1/8 in.	1 15/16 in.	3 1/4 in.	1/4 in.	10 0 0	Tilau
9 ,,	3 1/2 x 2 1/8	1 3/8 ,,	2 5/16 ,,	4 1/4 ,,	5/8 ,,	11 10 0	Tilba
11 ,,	4 1/2 x 3 1/4	1 5/8 ,,	3 1/16 ,,	5 1/16 ,,	1 1/16 ,,	14 0 0	Tilce
12 ,,	5 x 4	1 3/4 ,,	3 7/16 ,,	5 3/4 ,,	1 7/16 ,,	15 5 0	Tildi
13 ,,	5 1/2 x 3 3/4	2 ,,	3 3/4 ,,	6 1/16 ,,	1 3/16 ,,	16 15 0	Tilfo
17 ,,	6 1/2 x 4 3/4	2 1/4 ,,	4 3/4 ,,	8 ,,	1 3/4 ,,	27 10 0	Tilgu
22 ,,	8 1/2 x 6 1/2	3 ,,	6 1/2 ,,	10 ,,	2 1/4 ,,	47 0 0	Tilhe
40 ,,*f*/8	8 1/2 x 6 1/2	3 1/2 ,,	10 3/8 ,,	20 ,,	3 5/16 ,,	85 0 0	Tilji

Mounted in Focussing Settings.

Equiv. Focus	Flange Sizes	Price	Code Word
		£ s. d.	
*4 in	—	8 10 0	Tilica
6¼ ,,	1 1/8 in.	12 10 0	Tilaus
9 ,,	1 3/4 ,,	14 0 0	Tilhas
11 ,,	2 ,,	17 10 0	Tiljes
12 ,,	2 1/4 ,,	18 15 0	Tilkis
13 ,,	2 1/2 ,,	20 5 0	Tillos

* For Leica Cameras.

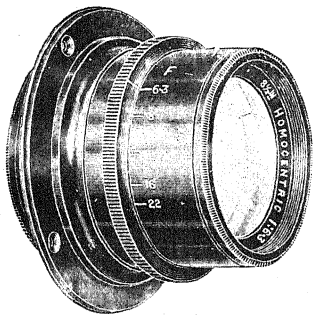
Teleros Lenses in Iris Settings with threaded back cells for screwing into shutters.

Equiv. Focus	Compur
6¼ in.	No. 00-0
9 ,,	,, 0
11 ,,	,, 1
12 ,,	,, 1A
13 ,,	,, 2-4/1
17 ,,	,, 3-6/1

ROSS TELEROS LENS, *f*/6.3
(Three Power).

Equi. Foc.	Plate Covered	Flange Inside Dia.	Length Over-all	Infinity Back Cell to Screen	Back Cell to Flange	Price in Iris Setting	Code Words	Shutters Suitable
ins.	ins.	ins.	ins.	ins.	ins.	£ s. d.		
9	2 1/2 x 1 3/4	1 1/4	3 3/16	3 3/16	1/4	11 10 0	Triras	1 Compur
13	3 1/2 x 2 3/8	1 1/2	4 1/2	4 1/2	5/8	14 10 0	Triret	2/5 ,,
17	4 1/2 x 3 1/2	2	5 5/8	6 1/16	1 1/16	22 0 0	Tririu	4 compound
25	6 1/2 x 4 3/4	2 3/4	8 1/2	8 1/16	1 3/8	47 0 0	Trirov	5 ,,

Prices in focussing settings on application.



THE ROSS HOMOCENTRIC LENSES

The Homocentric Lenses are excellent anastigmats, suitable for practically all branches of photography. The smaller sizes are most popular for small hand cameras. The single components of the F/6.3 and F/8 lenses give very good results with a medium stop.

PRICES.

ROSS HOMOCENTRIC LENS, *f*/6.3

Equiv. Focus		Plate Covered		Flange Sizes	Price in Iris Setting	Code Word
		Full Aperture	Medium Stops			
mm.	in.	in.	in.	in.	£ s. d.	
127	5	4¼ x 3¼	5 x 4	1⅜	5 10 0	**Heath**
140	5½	4¾ x 3½	6 x 5	1½	5 15 0	**Hebra**
152	6	5 x 4	6½ x 4¾	1⅝	6 2 6	**Hector**
165	6½	5½ x 3½	7 x 5	1⅝	6 12 6	**Hecat**
178	7	6⅛ x 4⅝	7½ x 5	1⅝	7 2 6	**Hedon**
218	8½	7⅛ x 5	8½ x 6½	2	9 2 6	**Heeg**
254	10	8½ x 6½	10 x 8	2¼	12 15 0	**Hefra**
305	12	10 x 8	12 x 10	2⅝	18 15 0	**Hegron**
380	15	12 x 10	15 x 12	3⅛	26 5 0	**Hehlor**

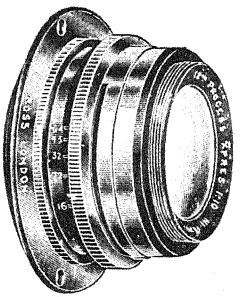
ROSS HOMOCENTRIC LENS, *f*/8

Equiv. Focus		Plate Covered		Flange Sizes	Price in Iris Setting	Code Word
		From	To			
mm.	in.	in.	in.	in.	£ s. d.	
178	7	6½ x 4¾	8½ x 6½	1⅜	6 15 0	**Hida**
218	8½	7⅛ x 5	10 x 8	1⅝	8 5 0	**Hiendel**
254	10	8½ x 6½	12 x 10	2	11 0 0	**Hiffar**
305	12	10 x 8	15 x 12	2¼	15 0 0	**Higor**
380	15	12 x 10	18 x 16	2⅝	20 0 0	**Hihone**
455	18	13 x 11	22 x 18	3¼	28 0 0	**Hikur**
533	21	15 x 12	25 x 22	3⅞	37 0 0	**Hileh**
610	24	18 x 16	30 x 24	4	47 0 0	**Himal**

Special Focussing Mounts, provided with Iris Diaphragms, are supplied at a small extra cost for use with Cameras of fixed extension. These special mounts do not admit of between-lens shutters.

Cost of pairing two Lenses for Stereoscopic Work, 15/-.

ROSS LTD **CLAPHAM COMMON** **LONDON, S.W.4**



THE ROSS PROCESS XPRES LENS AND REVERSING PRISMS FOR LINE, HALF-TONE AND THREE-COLOUR WORK.

The Process Xpres Lens has been specially designed to meet the most exacting requirements of all branches of modern process work. It is unrivalled for three-colour photography and the finest line and half-tone work.

PRICES.

Focus		Aperture	Plate covered at full aperture copying same size	Price	Code Word	Prism No.
m/m	ins.			£ s. d.		
330	13	F/9	13 x 9	15 0 0	**Phaba**	1
406	16	F/10	15 x 12	20 0 0	**Phace**	1a
460	18	F/10	18 x 13	24 0 0	**Phadi**	2
530	21	F/10	20 x 16	28 0 0	**Phafo**	3
635	25	F/10	25 x 18	38 0 0	**Phagu**	4
760	30	F/16	30 x 20	48 0 0	**Pheha**	4
914	36	F/16	36 x 24	68 0 0	**Pheje**	5
1066	42	F/16	40 x 30	87 0 0	**Pheli**	6
1130	48	F/16	45 x 36	110 0 0	**Phemo**	6

If a Lens is required with a Reversing Prism add the letter "P" to code-word for Lens

ROSS REVERSING PRISMS for Photo-Mechanical Work.

These Prisms are made of carefully annealed colourless crown glass and are accurately rectangular. The mount of the Prism screws directly to the hood of the lens, bringing one of the non-reflecting surfaces close up to the front lens. The Prism is thus used to full advantage. The Hypothenuse surfaces are silvered to ensure complete reflection. To obtain accurate centering it is necessary to send your lens when ordering.

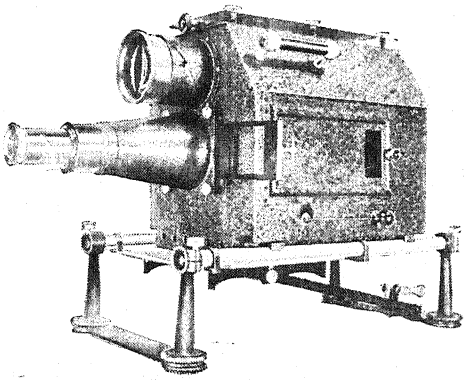
PRICES of Prisms mounted in Metal Box with revolving collar.

No.	Length and Breadth of non-reflecting surfaces		Price	Code Word
	ins.	m/m	£ s. d.	
1	2½	65	18 0 0	**Promote**
1a	2¾	70	22 0 0	**Promost**
2	3	75	26 0 0	**Promont**
3	3¼	80	30 0 0	**Promove**
4	3½	90	38 0 0	**Prompt**

Prices for Apochromatic Lens of similar foci for colour work and Prisms of larger size on application.

ROSS LTD. CLAPHAM COMMON LONDON, S.W4

THE ROSS EPIDIASCOPE



THE vast experience of Ross Ltd. has enabled them to produce a most efficient Epidiascope at a reasonable price, and embodying many exclusive features which place this instrument in a class by itself.

The lenses are of the finest optical quality and give perfect definition. A new system of illumination and ventilation enables the most valuable and delicate specimens to be shown without fear of damage by heat.

Opaque objects and lantern slides are projected with equal brilliance, whilst the placing and withdrawing of opaque objects is most easily effected.

The change over from episcopic to diascopic protection is very simple and effected almost immediately.

A metal pointer with universal adjustment allows the lecturer to draw attention to any part of the object shown whilst still operating the instrument.

When the instrument is tilted, critical definition is easily secured by the adjustment of a screw on the front of the Lamphouse.

THE PRICE

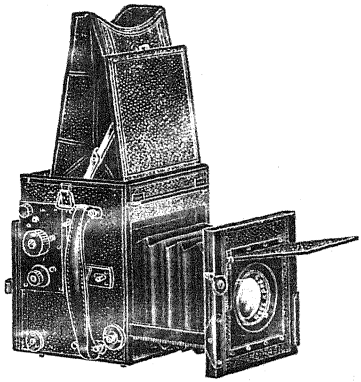
"Ross" Epidiascope with Condensers, Mirrors, 10½ ins. focus large aperture diascopic and 17 ins. ditto episcopic projection lenses, Slide Carrier for either English or Continental size lantern slides, Table Stand, complete but without projection Lamp is

£35 10 0

Extra for: 500-Watts Lamp . . . £1 5 0
1000-Watts Lamp . . . £1 12 0

Descriptive and illustrated booklet sent post free on application

ROSS LTD. CLAPHAM COMMON LONDON, S.W.4.



THE ROSS STANDARD REFLEX CAMERA

This camera is of the highest quality and best workmanship throughout. It is fitted with every adjustment necessary for the finest reflex work but has no elaborate and unnecessary movements to complicate the working of the camera and get out of order.

Among several special features is the focal plane shutter. With this shutter the various speeds are obtained by simply altering the width of the slit.

Complete details and specification on application.

PRICES.

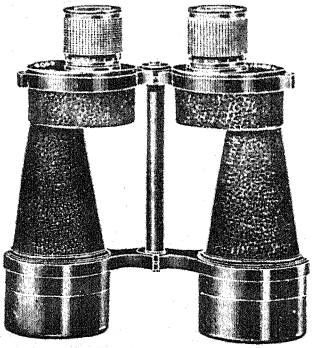
	3¼ x 2½ 5in. lens	¼-plate 5½in. lens	Post-card Size. 6in. lens	5½ x 3½ with Stereo attachment and 2 5 in. lenses	5 x 4 6in. lens	½-plate 8½in. lens
Camera with 3 Solid Slides, no lens ..	£ s. d. 23 10 0	£ s. d. 23 10 0	£ s. d. 27 0 0	£ s. d. 30 0 0	£ s. d. 30 0 0	£ s. d. 40 0 0
With Ross Xpres, f/2.9 .. Code Words	5⅛″ lens 39 0 0 **Minilex**	6½″ lens 41 0 0 **Refbex**				
With Ross Xpres, f/3.5 Code Words	5⅛″ lens 35 0 0 **Minimop**	6½″ lens 37 10 0 **Refjut**	6½″ lens 41 0 0 **Refjas**		7½″ lens 46 0 0 **Refkav**	10″ lens 70 0 0 **Refliy**
With Ross Xpres, f/4.5 Code Words	4¾″ lens 30 10 0 **Minleg**	31 0 0 **Refule**	6½″ lens 37 0 0 **Refews**	45 15 0 **Reflock**	6¼″ lens 40 0 0 **Refnok**	54 10 0 **Refnole**
With Ross Homocentric Lens, f/6.3 .. Code Words	29 0 0 **Miniflap**	29 5 0 **Reflap**	33 2 6 **Reflate**	41 15 0 **Refster**	36 2 6 **Refloor**	49 2 6 **Refloat**
Solid D.D. Slides, each	0 15 0	0 15 0	0 18 6	0 18 6	0 18 6	1 7 6
Book-Form Slides, each	1 10 0	1 10 0	2 0 0	2 0 0	2 0 0	2 10 0
For Swing Front, extra	3 8 6	3 8 6	3 15 0	3 15 0	4 5 0	4 15 0
Changing Box for 12 plates	4 5 0	4 5 0	5 0 0	5 0 0	5 0 0	5 17 6
Film-pack Adapter ..	1 15 0	1 15 0	2 2 6	2 2 6	2 2 6	2 16 0
Antinous Release, extra	0 5 6	0 5 6	0 5 6	0 5 6	0 5 6	0 5 6

Stereo Focussing Magnifier, fits hoods of all cameras, £1 1s. 0d.
The post-card size cameras are not fitted with reversing back.
Leather Cases for any outfit to order.

Prices for Continental sizes post free on application.

ROSS, LTD. CLAPHAM COMMON LONDON, S.W.4

ROSS EXTRA WIDE FIELD



STEREO PRISM BINOCULAR

MAGNIFICATION 7 DIAMETERS "STEPNITE"

"STEPNITE" has been specially designed for use at dusk and fo observation at night.

The light transmitting power is very greatly in excess of that o any prism binocular previously made, and by reason of large prisms and lenses and eyepieces of special design, the illumination at margins o field is 137 per cent. greater than that obtained with other binocular of the same power and aperture. Further, the central illumination i fully 20 per cent, greater and the perfect definition is maintained ove practically the whole field, whereas in other types of binocular th definition falls off rapidly towards the margins of field. These of great luminosity and critical definition at margins of field binocular unsurpassable for the use of officers of the Navy and M Marine, Yachtsmen, Huntsmen, Sportsmen, Surveyors and o

With "Stepnite" objects can be picked up and clearly seen immedi they enter the field of vision, whereas generally these objects escap notice altogether.

Effective diameter of Object Glasses 50 mm.		Stereoscopic Power	14
Real Field of View	7°	Weight of Binocular	34 oz
Linear per 1,000 yards	122	Price	£21 10
		Code Word	"Stepnite"

Description and Illustrated booklet of other models and of telescope post free on request.

Showrooms :—13-14 Great Castle Street, Oxford Circus, W.1.

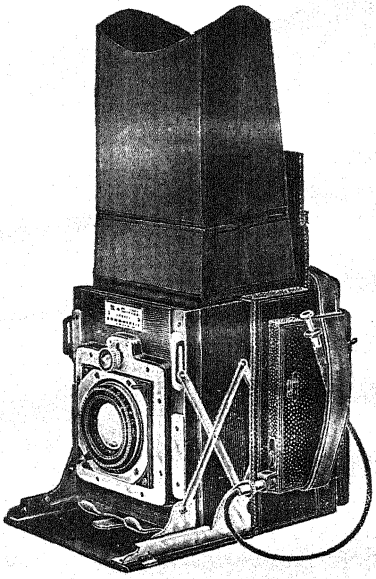
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PATENT FOLDING REFLEX

Manufactured in Two Models :—
SPECIAL. **F/2.9 and F/3.5 Lenses.**

STANDARD
for F/4.5 Lenses
And in One Size only, namely—3½ × 2½ ins., or 6½ × 9 c.m.

The product of over thirty years' experience in the design and construction of the best.



Standard Model.

The Camera is finished in the usual "N & G" style; to previous users of our apparatus no more need be said, it is simple and straightforward to manipulate and still remains by far the most practical and successful **Folding Reflex** on the market.

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PRICES.

PATENT FOLDING REFLEX.

Camera complete with 3 "N & G" Double Metal Book Form Dark Slides, Dark Slide Adapter, and Hooded Focussing Screen.

STANDARD MODEL.

	£	s.	d.
Fitted with Ross F 4.5 Xpres Lens, 5½ in.	27	5	0
Fitted with T.T. & H. F 4.5 Aviar Lens, 5½ in.	27	10	0
Fitted with Dallmeyer F 4.5 Serrac Lens, 5½ in.	26	15	0
Dallmeyer F 5.6 Dallon Telephoto Lens, 10 in. focus	47	0	0
Ross F 5.5 Teleros Lens, 11 in. focus	45	10	0

SPECIAL MODEL.

	£	s.	d.
Fitted with Ross F 2.9 Xpres Lens, 5½ in.	38	5	0
Fitted with Dallmeyer F 2.9 Pentac Lens, 5½ ins.	57	0	0
Fitted with Ross F 3.5 Xpres Lens, 5½ in.	56	0	0
Fitted with Dallmeyer F 3.5 Dalmac Lens, 6 in.	53	0	0
Ross F 5.5 Teleros Lens, 11 in. focus	51	10	0
Dallmeyer F 5.6 Dallon Telephoto Lens, 10 in. focus	18	10	0
	15	15	0

"SIBYL" CAMERAS.

PLATE MODELS, complete with 3 "N & G" Metal Double Dark Slides and Focussing Screen.

Lens.	Baby 4½ × 6 c/m	New Special 3½ × 2½ or 6½ × 9c m	New Ideal ¼-plate or 4¼ × 3¼
Ross F4.5 Xpres	£19 5 0	£23 0 0	Double Dark Slides cannot be supplied.
T.T. and H. F4.5 Sibyl Aviar	19 5 0	22 10 0	
Dallmeyer F4.5 Serrac ...	18 10 0	22 5 0	
Wray F4.5 Lustrar	17 10 0	21 5 0	

The New "Sibyl Vitesse." 3½ × 2½ in. or 6½ × 9 c.m.

Ross F.3.5 Xpres Lens... ...	£30 0 0
Dallmeyer F3.5 Dalmac Lens...	28 10 0

PLATE MODELS, complete with 6 Single Metal Dark Slides, instead of Double Dark Slides.

Ross F4.5 Xpres	Single Dark Slide cannot be supplied	£21 10 0	£25 0 0
T.T. and H. F4.5 Sibyl Aviar		21 0 0	25 0 0
Dallmeyer F4.5 Serrac ...		20 10 0	24 5 0
Wray F4.5 Lustrar		19 10 0	23 5 0

ROLL FILM MODELS.

The New "Sibyl Excelsior." 4¼ × 2½

Ross F4.5 Xpres	£32 10 0
T.T. and H. F4.5 Sibyl Aviar ...	32 10 0
Dallmeyer F4.5 Serrac ...	31 15 0

Lens.	Baby 4½ × 6 c/m	New Special 3½ × 2½ or 6½ × 9c m	New Ideal ¼-plate or 4¼ × 3¼
Ross F4.5 Xpres	£23 5 0	£26 10 0	£30 15 0
T.T. and H. F4.5 Sibyl Aviar	23 5 0	26 0 0	30 15 0
Dallmeyer F4.5 Serrac ...	22 10 0	25 15 0	30 0 0
Wray F4.5 Lustrar	21 10 0	24 15 0	29 0 0

TELE-PHOTO LENSES for use with "Sibyl" Cameras.

Dallmeyer F6.5 Dallon ...	(5½ in.)	£5 10 0	(9 in.)	£8 12 6	(10½ in.) £10 10 0
Ross F5.5 Teleros ...	(6½ in.)	10 10 0	(9 in.)	12 5 0	(11 in.) 14 15 0



KODAK

LONDON. W.1 : 115 Oxford Street
W.1 : 184-6 Regent Street
W.8 : 43 Kensington High Street
S.W.3 : 59 Brompton Road
S.W.1 : 96 Victoria Street
E.C.2 : 91 Bishopsgate
W.C.2 : 61-5 Kingsway

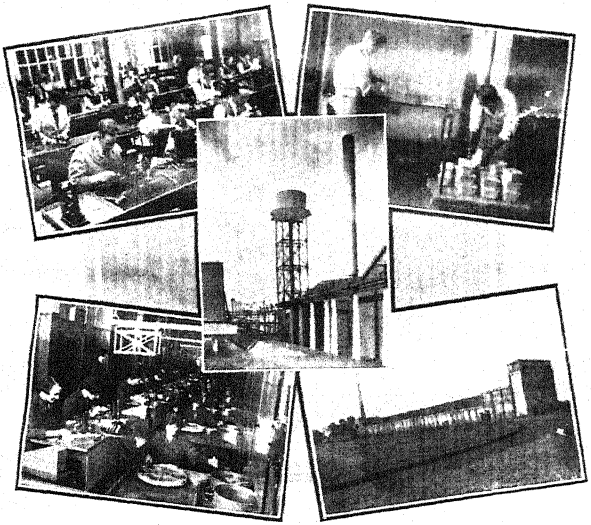
BIRMINGHAM. 45 Corporation Street
LIVERPOOL. 70 Lord Street
NEWCASTLE-ON-TYNE. 32 Grainger Street
GLASGOW. 46 Buchanan Street
DUBLIN. 89 Grafton Street

Associated Companies in

Algeria, Argentine, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Cuba, Czechoslovakia, Denmark, Dutch East Indies, East Africa, Egypt, France, Germany, Greece, Hawaiian Islands, Holland, Hungary, India, Italy, Japan, Jugoslavia, Mexico, New Zealand, Palestine, Panama, Peru, Philippine Islands, Poland, Portugal, Roumania, South Africa, Spain, Straits Settlements, Switzerland, Syria, Turkey, U.S.A., Uruguay.

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Views of the Kodak Factory
. . at . .
Wealdstone, Middlesex



Here, under ideal conditions, over 2,000 British workers are engaged in making "Kodaks," "Brownies," Ciné-"Kodaks," "Kodascopes," "Kodatoys," X-Ray Films, Ciné Films (35 mm. and 16 mm.), Papers, and many Photographic Sundries.

Kodak Limited employ over 4,000
people in their British factory
and organisation.

KODAK LTD., Kodak House, Kingsway, London, W.C.2

A Great Advance!

"VERICHROME" FILM

The introduction of "Verichrome" Film in the Spring of 1931 marked one of the greatest advances in the history of photography. It placed in the hands of roll film users—the immense majority of amateur photographers—a film that not only gives *better pictures* in all weathers and in all circumstances but definitely increases picture-making opportunities.

"Verichrome" has the following unique combination of qualities :—

1. DOUBLE COATED. It has two layers of sensitive silver emulsion—a Fast one over a Slow.
2. HIGH SPEED. Good pictures can be made earlier and later in the day—and the year.
3. ENORMOUS LATITUDE. Because of this Double Coating, "Verichrome" allows remarkable latitude. A spool of "Verichrome" has been given relative exposures ranging from 1 to 2,400, and *all have yielded printable negatives.*
4. COLOUR SENSITIVITY. "Verichrome" is particularly sensitive to greens and yellows—the colours which predominate in nature.
5. NON-HALATION. A special red backing on the non-sensitive side, prevents halation and ensures clear-cut detail in brightest highlights. (This red backing disappears on development).
6. TRANSLUCENCE. This makes "Verichrome" negatives particularly suitable for enlarging.

KODAK FILM

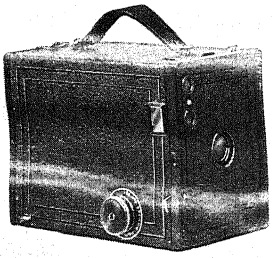
Is not superseded by the introduction of "Verichrome." The same qualities of speed, latitude and uniformity which have earned for it the title of "The Dependable Film in the Yellow Carton" will still be at the amateur's disposal.

NOTE :—Both "Verichrome" and Regular Kodak Film are made in Pack Form as well as in Roll Film.

KODAK LTD., Kodak House, Kingsway, London, W.C.2

"BROWNIES"

THE SIMPLEST REAL CAMERAS



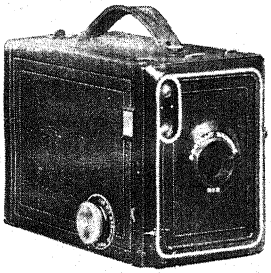
Inexpensive, strongly made and absolutely simple to use, the "Brownie" is pre-eminently the camera for children. But it finds equal favour with 'grown-ups,' too, who want to do their picture-making with the minimum of trouble and expense. To-day, over thirty years after its introduction, the "Brownie" is still the most popular camera in the world.

Coloured models are available in two of the sizes at the same prices as the Black.

Portrait "Brownie"

THE TWO-PURPOSE "BROWNIE"

Used in the same way as the No. 2 "Brownie," the Portrait "Brownie" takes landscapes, groups, etc.; press a lever, and you can take intimate 'close-ups' at about three feet from your subject. Charming head-and-shoulder portraits, studies of flowers and fruits, medium distant groups and long distance views—all are easy with the Portrait "Brownie." In Black and Six Colours.

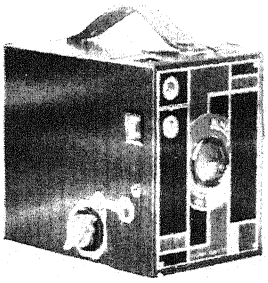


Prices of Brownies range from **8/6**

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Beau "Brownie"

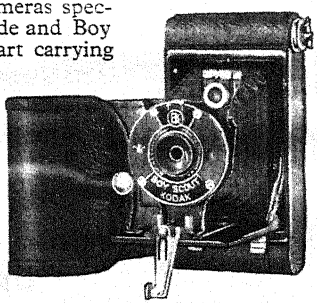
THE "BROWNIE" BEAUTIFUL



With its modernistic front of two-colour enamel and its handsome finish (it is made in Blue and Brown as well as Black) this camera lives up to its name of *Beau* "Brownie." The Doublet Lens and new, smooth-working, One-Way Shutter prove that similar care to that lavished on its appearance has been extended to the optical and mechanical details of construction as well. Picture size $3\frac{1}{4} \times 2\frac{1}{4}$ ins.

Boy Scout and Girl Guide "Kodaks"

OFFICIALLY AUTHORIZED



Two compact folding cameras specially made for the Girl Guide and Boy Scout Associations. A smart carrying case for attaching to the belt is supplied with each camera. Both are fitted with Meniscus Lens, Rotary Shutter for 'Time' and 'Instantaneous' exposures, 'Brilliant' Reversible Finder and Tripod Socket. The Boy Scout "Kodak" is finished in Dark Green and the Girl Guide in Dark Blue enamel. The Badges of the Scout and Guide Associations are stamped on their respective cameras.

Boy Scout or Girl Guide "Kodak," complete with case **27/6**

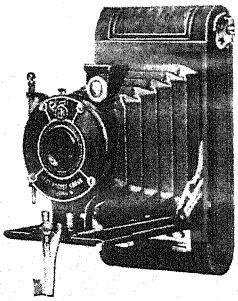
KODAK LTD., Kodak House, Kingsway, London, W.C.2

Vest Pocket "Kodak"

Model B

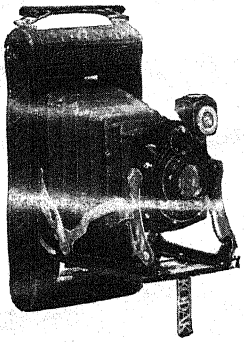
FITS THE WAISTCOAT POCKET

The key to the popularity of this model is given in its name. It is truly a 'Vest Pocket' "Kodak"—and a 'Ladies' Hand-bag' "Kodak" too. Its picture size is $2\frac{1}{2} \times 1\frac{5}{8}$ in.—larger than you could expect for so compact an instrument. The equipment includes a Meniscus Lens, Rotary Shutter for 'Time' and 'Instantaneous' exposures, 'Brilliant' Reversible Finder and Tripod Socket.



Price, 25/-

Pocket "Kodaks" Junior



WITH RAPID OPENING DEVICE

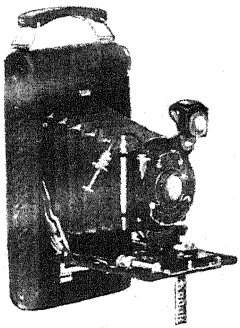
One movement opens this camera and brings the lens into picture-making position. In other details the Junior model closely resembles the Pocket "Kodaks" described on the opposite page. Two picture sizes: $3\frac{1}{4} \times 2\frac{1}{4}$ in. and $4\frac{1}{4} \times 2\frac{1}{2}$ in.

Prices from **£2 2 0**

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Pocket "Kodaks"

INEXPENSIVE PICTURE MAKERS



Compact, folding cameras, free from complicated 'gadgets.' They have strong, sturdy, yet light, metal bodies, covered with durable leatherette. Although moderately priced, these "Kodaks" are obtainable fitted with the well-known Kodak Anastigmat Lens *f*6.3—the 'all-weather lens.' Picture sizes range from 3¼ × 2¼ in. to 5½ × 3½ in.

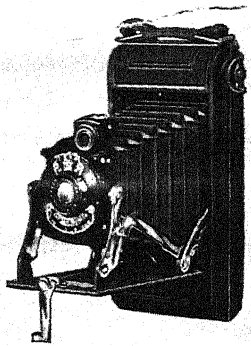
Prices from **£2 7 6**

Pocket "Kodaks" Series II

QUICK ACTION "KODAKS"

The Series II catches the unexpected picture. The bellows are extended and the lens snaps into position as the camera is opened out. In the focussing models, a turn of the lens mount sets the focus for any distance from 5 or 6 feet to infinity.

The bodies are constructed of aluminium, and real black leather is used for the covering. Exposed metal parts are nickelled or black enamelled.



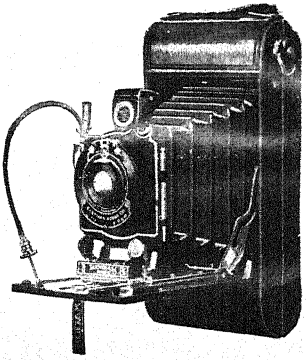
Prices from **£2 10 0**

KODAK LTD., Kodak House, Kingsway, London, W.C.2

"Kodaks" Series III

UP-TO-DATE, WELL MADE, BEAUTIFULLY FINISHED

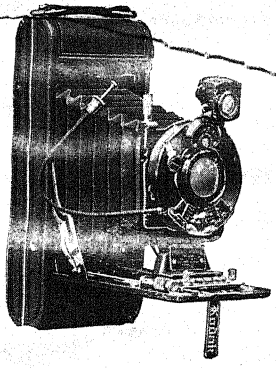
The Series III cameras satisfy novice and expert alike. They are free from complicated and unnecessary 'gadgets,' which hinder the novice rather than help him, yet they are equipped with every feature essential to the making of good pictures. High-grade Anastigmat lenses are fitted in "Diomatic" or "Compur" Shutters, and a Rising Front is provided on all but the Vest Pocket and No. 1 sizes.



Prices from **£2 10 0**

"Kodaks" Special

CAMERAS FOR CONNOISSEURS



Prices from **£5 0 0**

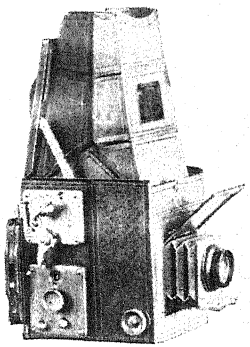
"Kodaks" Special are made for those who demand the best that money can buy. In these models the highest optical and mechanical efficiency is allied to beautiful workmanship and handsome appearance.

A Rising Front is provided on all sizes except the Vest Pocket and No. 1, and on the No. 2C and 3A a Range Finder is fitted, which eliminates guesswork in focussing. Picture sizes range from $2\frac{1}{2} \times 1\frac{5}{8}$ in. to $5\frac{1}{2} \times 3\frac{1}{4}$ in.

KODAK LTD., Kodak House, Kingsway, London, W.C.2

"Graflex" Cameras

FOR HIGH-SPEED WORK



These cameras possess the decided advantage of reflecting a view of the subject, full negative size and right way up, until the moment of exposure. This, together with the long range of speeds given by the focal plane shutter, make "Graflex" Cameras supreme for arresting rapid movement. They are equally well suited for portraiture and ordinary view work. A wide range of Anastigmat lenses is available. Cut Films, Film Packs, Roll Films and Plates can all be used by means of appropriate adapters.

Prices on application.

Amateur Cinematography

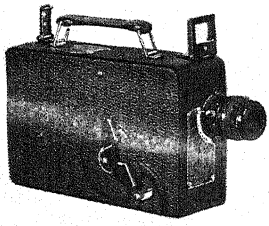
The year 1931 saw still further advances towards the perfection of sub-standard cinematograph apparatus and materials for amateurs. Progress mainly took the form of simplification of existing apparatus and the introduction of new cameras, projectors and film. The outstanding technical achievement was the introduction of **Ciné-Kodak Super-sensitive Panchromatic Film**, which, by reason of its amazing speed, especially under artificial light, opened up entirely fresh fields for amateurs, especially in night work, both indoors and out.

In the following pages will be found a concise review of the most popular models of Ciné-"Kodaks" and "Kodascopes." In the brief space at our disposal, it is impossible to do more than mention the chief features of the various instruments; full particulars will gladly be sent on request, together with details of the "Kodascope" and "Kodatoy" Libraries, and Cine "Kodagraphs."

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Ciné-"Kodak" Model BB Junior f1.9 and f3.5

FOR THE MAN OF MODERATE MEANS



At the price of an ordinary 'still' camera, the man of moderate means can now obtain a 16 mm. motion picture camera with spring-driven motor, direct vision viewfinder, automatic footage indicator, an *f*3.5 or ultra-rapid *f*1.9 lens—in fact, all those features which have hitherto been exclusive to much costlier models.

The Ciné-"Kodak" Junior holds 50 feet of film. Loaded with "Kodacolor" Film and with a "Kodacolor" Filter slipped over the lens, the *f*1.9 model makes *motion pictures in full natural colours* as easily as it makes black-and-white movies. The beauty and fidelity to Nature of "Kodacolor" pictures are one of the photographic marvels of the age, and have been praised by such an authority as the late Sir William Orpen.

The *f*3.5 model is fixed focus, a Portrait Attachment is obtainable separately for 'close-up' work. The *f*1.9 model can be focussed from 2 feet to infinity by a turn of the lens mount. Durable black leatherette, neatly grained, covers the light metal body, and metal parts are enamelled or nickelled.

Ciné-"Kodak" Model BB Junior with f3.5 lens **£13 13 0**

" " " " " f1.9 " **18 18 0**

Ciné-Kodak Film

(Cost includes processing and return postage in United Kingdom)

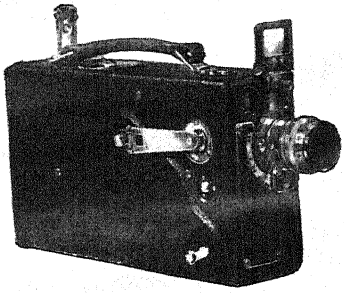
	Panchromatic	*Super-sensitive Panchromatic*	*"Kodacolor"*
50 ft. spool ..	**14/-**	**17/6**	**21/-**
100 ft. spool ..	**26/-**	**32/6**	**40/-**

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Ciné-"Kodak" Model K

f1.9 and f3.5

WITH INTERCHANGEABLE LENSES AND NORMAL AND HALF SPEED DEVICE



The Model K is the last word in 16 mm. Amateur Movie Cameras. It takes either a 50-foot or 100-foot spool of 16 mm. film, yet it weighs barely $3\frac{3}{4}$ pounds. Various types of lenses can be fitted, all of which are interchangeable with each other: *f*3.5, *f*1.9; Long Focus *f*4.5 for Telephoto work and a Wide Angle *f*2.7 Lens.

There are two speeds: normal (16 frames per second) and half-speed (8 frames per second). The latter movement, which is brought into operation by the simple pressure of a button on the side of the camera, is useful for "trick" shots and for movie-making on dull days or indoors.

Other features include: Spring Driven Motor, which operates the mechanism smoothly and efficiently; Direct Reflecting View-finders, for eye and waist level use; Automatic Footage Indicator, shows amount of film used; Exposure Guide, which is fixed to the front of the camera; and that compactness and neatness of design and finish which is characteristic of Kodak apparatus. By the use of "Kodacolor" Film and a "Kodacolor" Filter, *motion pictures in full natural colours* can be made with the *f*1.9 model.

PRICES

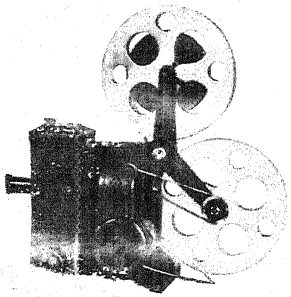
Ciné-"Kodak" Model K, with f3.5 lens ..	£31 10 0
" " " " f1.9 " ..	£40 0 0
Long Focus Lens, f4.5	£12 12 0
Wide Angle Lens, f2.7	£12 12 0

KODAK LTD., Kodak House, Kingsway, London, W.C.2

"Kodascope" Model C

THE PROJECTOR FOR THE MAN OF MODERATE MEANS

Compact, portable 16mm. projector which holds 400 ft. of film and projects a 40 × 30 in. picture at 9 or 18 ft., according to lens used. Runs from any house electric supply. Illumination provided by 100 watt lamp. Resistances adapt it for different voltages. Motor-driven Rewind. Handsomely finished in bronze.

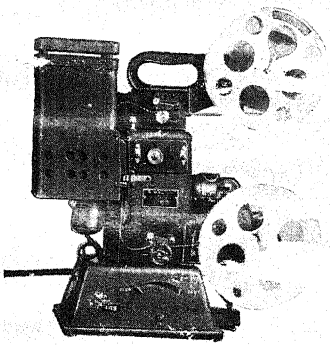


By arrangement with Claude Lyons Ltd., Liverpool, a "Clarostat" branded Resistance is fitted as control of the motor of this machine.

Prices from **£18 18 0**

"Kodascope" Model A

PARTICULARLY SUITABLE FOR SCHOOL, LECTURE HALL AND COMMERCIAL USE



Projects a 52 × 39 in. picture at 23 feet. Runs from ordinary electric supply. Powerful 250 watt lamp supplies illu-

device is provided. By the addition of a supple-

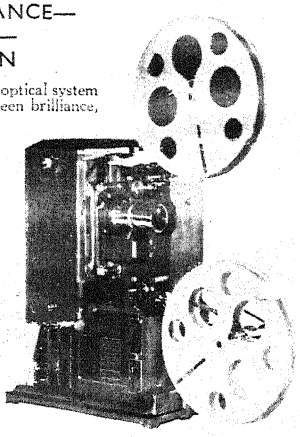
natural

Price **£75 0 0**

KODAK LTD. Kodak House, [illegible], W.C.2

"Kodascope" Model K

MAXIMUM SCREEN BRILLIANCE— EFFICIENT COOLING— SIMPLIFIED OPERATION

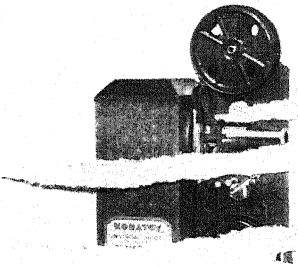


A specially designed 250 watt lamp and optical system give direct illumination and maximum screen brilliance, and a carefully light-trapped lamphouse ensures a minimum of stray light. Lamphouse is kept cool by a new type of motor-driven fan. A table lamp can be plugged into "Kodascope" to work alternately with projection lamp; table lamp is switched off and "Kodascope" switched on, and *vice-versa*, in one movement. Other features include high speed motor-driven rewind; interchangeable lenses; mechanical reverse; central lubrication; indirectly illuminated ammeter; projection lamp and optical parts attached to hinged door of lamphouse, easily accessible for cleaning.

"Kodacolor" pictures—motion pictures in full colours—can be projected with "Kodascope" Model K.

"Kodatoy"

A HOME MOVIE OUTFIT FOR CHILDREN



A complete 16mm. projector, simple, safe, and inexpensive. Can be used on all voltages from 100 to 250. Available as either hand operated or motor-driven model. Normal capacity 100 ft. of film; extension arms can be fitted to take 400 ft. reels. "Kodatoy" is supplied complete with Miniature Theatre containing Silvered Screen. There is also a model which can be used with 6 volt accumulators.

Cine

"

Long

Wide Ar

Prices from £3 3 0

motion pictures for use with are available in 7, 15 and 25 feet lengths.

KODAK House, Kingsway, London, W.C.2

Eastman Professional Films

Eastman Professional Films give negatives of the highest printing qualities. They are unbreakable, light, occupy little space, and are most convenient to handle.

EASTMAN PORTRAIT FILM

The outstanding qualities of Eastman Portrait Film are its long scale of gradation, its remarkable latitude in exposure and its practical freedom from halation. These qualities enable the photographer who uses film to get negatives in which every variation of tone is recorded, from the highest high light to the deepest shadow.

Eastman Portrait Film is made in two speeds—*Par* and *Super Speed*. *Par Speed* has a rapid emulsion and is suitable for all ordinary work. *Super-Speed* is extremely rapid; it is indispensable where very brief exposures are demanded or when lighting conditions are poor.

Par Speed is now Double Coated, which enhances its superb quality, particularly in the rendering of high-light gradation and detail.

EASTMAN PORTRAIT PANCHROMATIC FILM

A new portrait film, completely colour-sensitive. It is fast, has a remarkably long scale of gradation and allows wide latitude in exposure

Should be used when correct rendering of colour values in monochrome is desired, but not exceptionally high speed.

EASTMAN COMMERCIAL PANCHROMATIC FILM

This film is sensitive to all colours of the spectrum, including red. It is as fast as the Portrait Panchromatic Film but is more adapted to commercial work.

EASTMAN COMMERCIAL ORTHO FILM

Is suitable for all kinds of work where general colour sensitiveness is required but not sensitiveness to red.

EASTMAN COMMERCIAL FILM

Has a somewhat slower emulsion than Eastman Portrait Film and is particularly suitable for copying.

EASTMAN PROCESS FILM and EASTMAN PANCHROMATIC PROCESS FILM

For copying drawings and subjects when an extreme degree of contrast is required. Specially adapted to the needs of the photo-engraver and lithographer. Panchromatic Process Film is sensitive to all the colours of the spectrum and is particularly suitable for three-colour work.

When flat film is required in sizes smaller than those in which Eastman Professional Film is listed, Kodak Cut Film is supplied

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Eastman Super-sensitive Panchromatic Film

AN EXTRA RAPID FILM OF SUPERLATIVE QUALITY

"It surpasses everything I have tried, for Speed, Latitude, and above all Quality."

"The Speed of this Film is almost *staggering*."

"I have been making a pretty comprehensive series of tests with it . . . . . and have found it *amazing*."

The above tributes to Eastman Super-sensitive Panchromatic Film by expert photographers are typical of the golden opinions it has won everywhere. In its Soft Gradation, Clean Working, Fine Grain, Full Panchromatic Sensitivity and, above all, its Amazing Speed, it marks the greatest advance to date in film making history.

KODAK LTD., Kodak House, Kingsway, London, W.C.2

"Velox"

THE KODAK GASLIGHT PAPER

"Velox" is made specifically to suit amateurs' negatives—and it makes the most of every one. Clear high-lights, deep, rich shadows and a long range of intermediate tones are the characteristics of the "Velox" print. Three grades—Vigorous, Medium and Soft—to cope with every type of negative; three surfaces—Glossy, Art (Semi-matt) and Carbon (Matt)—to satisfy every taste.

Packed in all popular sizes and in postcards. Look for the name on the back of every sheet.

Kodatone

THE KODAK DAYLIGHT PRINTING AND SELF-TONING PAPER

Prints on "Kodatone" have a charm and a quality all their own. Rich Sepia tones are obtained by using a fixing bath of plain hypo, but cool, pleasing purple tones can easily be obtained by a preliminary wash in common salt solution. Made in White and Cream, in all popular sizes and in postcards.

"*Solio*" *P.O.P.* and "*Solio*" *Self-toning* are also daylight papers which give bright prints of fine gradation and beautiful tones.

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Kodak Bromide Papers

Kodak Bromide Papers have a high reputation for quality and reliability. They allow great latitude in exposure, and give prints and enlargements with sparkling high-lights, rich, transparent shadows and a long range of finely graded half-tones.

VELVET BROMIDE
(Soft, Medium and Contrast)

A rapid paper with a beautiful velvety surface. Tones to a rich sepia. Supplied in Single and Double Weight.

PLATINO MATTE SMOOTH
(Soft, Medium and Contrast)

A rapid paper with a dead-matt surface. Made in Single and Double Weight.

PLATINO MATTE ROUGH

Similar to Platino Matte Smooth, but has a rough surface suitable for broad effects. Tones readily. Single weight only, and one degree of contrast—Soft.

"NIKKO"
(Soft, Medium and Contrast)

A rapid, mauve-white paper with a highly glazed surface. Unsurpassed for the rendering of fine detail in commercial or scientific photographs, and for Press work. Single and Double Weight.

PERMANENT SMOOTH
(Soft, Medium and Contrast)

A paper with a natural surface which is nearly matt. Suitable for contact prints or enlargements. Tones to a rich sepia. Made in Single Weight only.

PERMANENT ROUGH

Resembles Permanent Smooth in every respect except that it has a rough surface. Soft. Made only in Single Weight.

ROYAL TINTED
(Soft, Medium and Contrast)

A rapid, cream base paper with a rough, natural surface. Lends itself particularly well to sepia toning. Made in Double Weight only.

ROYAL WHITE
(Soft, Medium and Contrast)

A rapid rough paper with a natural surface. Similar to Royal Tinted, but is white. Made in Double Weight only.

OLD MASTER
(Cream and White)

A heavy, rapid paper with a distinctive canvas-like texture resembling that of an old painting. Soft.

CREAM

A rapid, smooth, tinted paper, particularly suitable for sepia toning. Soft. Made in Single and Double Weight.

KODAK BROMOIL PAPER

Is coated with a high-grade emulsion specially made for the Bromoil process. Rough White and Rough Cream, Double Weight only.

KODAK LTD., Kodak House, Kingsway, London, W.C.2

"KODURA"

The Professional Paper

"Kodura" is a high-class developing paper yielding rich, warm blacks by development only and fine sepia tones by either the Sulphide or Hypo-Alum method. "Kodura" also gives excellent brown-black, brown or red-chalk tones by direct development.

"Kodura" is a 'long scale' paper and will reproduce faithfully the delicate gradations of light and shade contained in a good portrait negative. Sparkling high-lights, finely graded half-tones and velvety shadows characterise a "Kodura" print.

Made in nine grades, Cream or White Base.

"ETCHING BROWN"

A paper giving delightful brown-black tones by direct development—tones that lend to the print the rich mellowness of an old engraving. Made in Double Weight only.

Smooth Matte White **Smooth Matte Cream**
Rough Matte Cream

"KOTHENA"

A Printing Paper that brings out the Hidden Beauties of your Negatives

"Kothena" is a slow paper giving a rich warm black image by direct development. It picks out the subtle half-tones and will reproduce every gradation, from the highest high-light right down to the deepest shadow.

B—White Semi-Matte C—White Smooth-Matte
D—White Rough-Matte E Smooth—Cream-Matte
E Rough—Cream Matte

"KOVITA"

"Kovita" is a paper of the well-known "Kodura" type, but much faster—fast enough to make it an excellent medium for enlargements. It is made in four grades, all of which yield sepia tones of delightful purity and richness by the Sulphide or Hypo-Alum bath. A slight sheen gives a certain attractive depth to the shadows and a brilliance to the print.

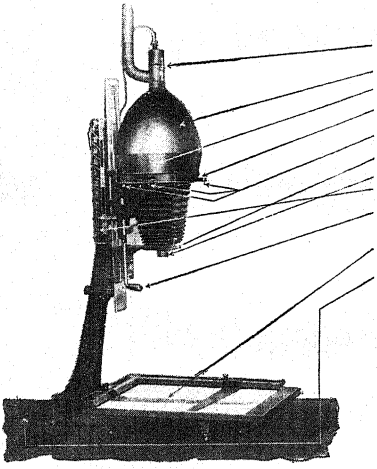
"Kovita" is made in four grades—Cream or White Base.

N—White Parchment O—Cream Parchment
C—White Matte E—Cream Matte

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Eastman Auto-Focus Enlarger

WITH IMPROVED LAMPHOUSE and 400 WATT LAMP



Always in focus, Speedy and Simple to use. Takes up to 7 × 5 inch negatives and makes prints up to 28 × 20 inches. Exposure controlled by foot switch; both hands left free for shading, etc.

A Reducing Attachment can be supplied, which when fitted to the Enlarger gives it a range from a four times enlargement to a two-and three-quarters times reduction.

The Kodak Auto-Focus Enlarger

For the use of amateurs. Takes any negatives up to 6 × 4 inches.

Prices on application

KODAK LTD., Kodak House, Kingsway, London, W.C.2

Kodak D. & P. Equipment and Systems

Reduce Costs—Reduce Handling—Speed-up Output

Keep in touch with modern manufacturing conditions. Call at our Kingsway Showroom and study the scale model of a complete modernised D. & P. Factory.

Let us show you how the number of films and prints handled by your workers can be doubled—how you can

ELIMINATE Clerical work
Spool numbering and sorting
Print trimming.

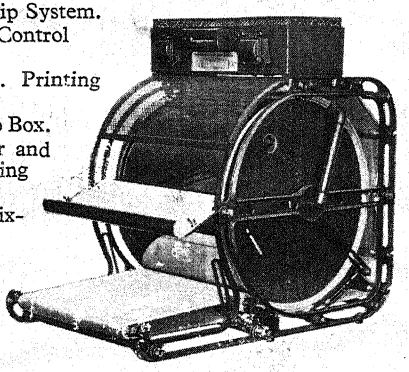
Make sorting and pricing a semi-automatic job.

A UNIQUE SERVICE. For those who cannot call, advice is freely given by correspondence, or personal visits will be made by demonstrators who will advise scientific redistribution of existing apparatus.

We recommend nothing that will not simplify operation, reduce costs, and increase efficiency and profits.

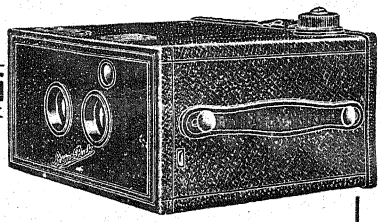
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The "Kodak" A Printer—for high speed printing.
New Type Clips and Rods.
"Kodak" Double Clip System.
"Kodak" Clerical Control System.
"Kodak" D. & P. Printing Control Box.
"Kodak" Film Strip Box.
"Velox" Distributor and Rotary Developing Unit.
"Kodak" Rotary Fixing Device.
"Kodak" Rocker Washer.
"Kodak" Junior Glazing Machine.



KODAK JUNIOR GLAZING MACHINE

KODAK LTD., Kodak House, Kingsway, London, W.C.2



The STEREO PUCK
makes
LIVING PICTURES.

THORNTON-PICKARD

SPECIALISTS in
Camera Construction

Famous Throughout the World.

RUBY
REFLEX CAMERAS,
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And the

New Wonder Camera

The **STEREO PUCK**

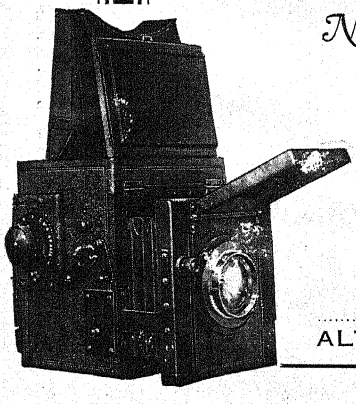
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PRICE
Complete with Viewer

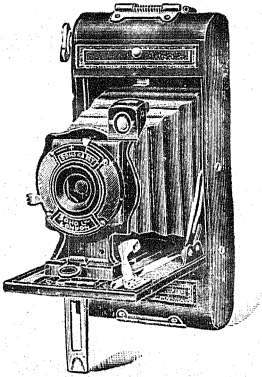
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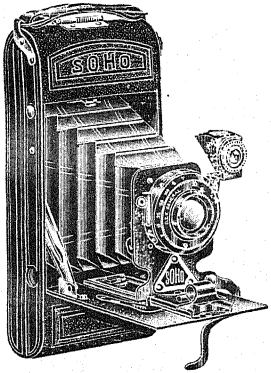


The "Soho" Cadet Camera.



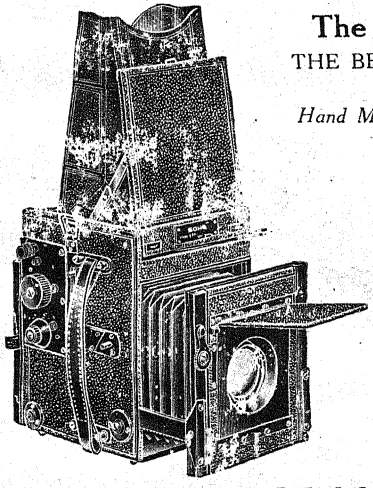
For any make of Roll Film $3\frac{1}{4}'' \times 2\frac{1}{4}''$. Rosewood design moulded body. T & I Shutter *Price* **25/-**

The "Soho" Altrex Camera.



For Pictures $3\frac{1}{4}'' \times 2\frac{1}{4}''$, Seven Speed Shutter. fitted with Kershaw Anastigmat f 6.3 *Price* **60/-**

OTHER ROLL FILM MODELS FROM 8/6 EACH.



The "Soho" Reflex.

THE BEST CAMERA IN THE WORLD.

Hand Made by Skilled Craftsmen.

VARIOUS SIZES and MODELS.

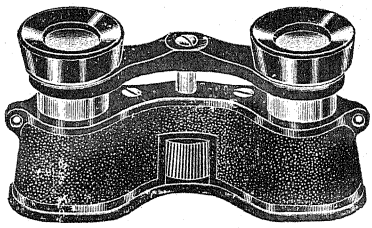
Illustrated Cat... *from*

SOHO LIMITED

SOHO SQUARE, LONDON, W.1.

Telephone: Gerrard 2184 (2 lines). **Telegrams: Noiram, Rath, London.**

The New Kershaw Theatre Glass.



THE
"BIJOU"

Supplied complete with Morocco Leather or Black Moire Silk Case.

OUTSTANDING FEATURES.

(1) "Wide Angle Field of View." (2) "High Optical Efficiency" (3) "Will retain its "brand new" appearance indefinitely; all metal parts are chromium plated,

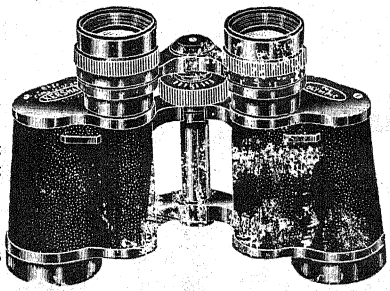
Price **25/-** *Complete*

Kershaw
Wide Angle Prismatic Binoculars.

There are Kershaw Binoculars for all occasions, the theatre, the races, and marine use.

THE
"OLYMPIC"

a general sports model in which light weight and handy size are combined with the finest optics. It is a glass that for field of view, brilliancy of image and definition is unrivalled A wide angle prism glass of distinction.



CATION,

Magnification—8 Effective Aperture of Object Glass—30 m/m's.
Emergent Penc 3·75 m/m's. Relative Illumination 14·06

FIEL EW 8°. 75 or 154 YARDS at 1000 YARDS.

Weight of Central Focussing Model — 22 ozs.

Price **£11 10 0** Complete with Leather Case and Sling.

SOHO LIMITED

SOHO SQUARE, LONDON, W.1.

Telephone: Gerrard 2184 (2 lines). **Telegrams: Noiram, Rath, London.**

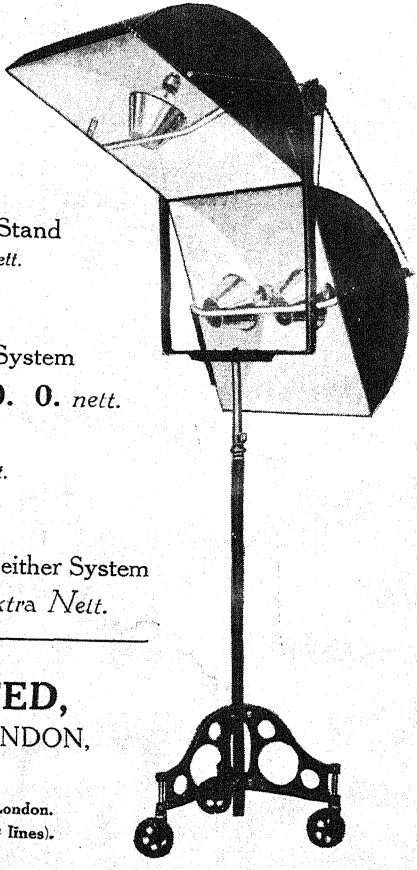
THE SOHO - BOARDMAN

New Twin Unit Adjustable System

of High Efficiency

HALF WATT LIGHTING.

Colour Corrected Light.



ON RUBBER-TYRED STAND

As Illustrated.

£12. 15. 0. *nett.*

Gilt finish Reflector & Stand

£1. 0. 0. Extra Nett.

Also Overhanging System

Black, Price **£7. 10. 0.** *nett.*

Gilt finish

10/- Extra Nett.

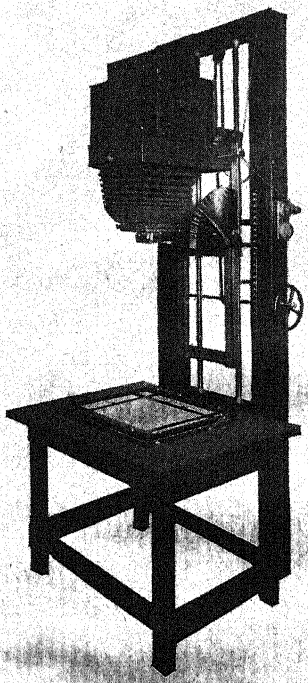
High efficiency Lamps for either System

Each **£1. 2. 6.** *Extra Nett.*

SOHO LIMITED,

SOHO SQUARE, LONDON, W.1.

Telegrams : Noiram. Rath, London.
Telephone : Gerrard 2184 (2 lines).



The "SICKLE" Vertical Enlarger

1932 Model.

With automatic adjustment. The last word of efficiency.

For Professional, D. & P. Worker or Photo-Technical use of every description.

Fitted with our **Mercury Vapour** Lamp for direct or alternating current to switch on and off in the ordinary way without tilting. Consumption 3½-amperes, 1,200 c.p., equal to at least 5,000 c.p. half-watt lamps, no condenser, of the greatest possible speed on account of its actinic rays, great economy and entirely free from excessive heat by means of special ventilation.

The Enlarger is solidly built of best material, will **reduce** to any size required without any extra apparatus or lens, and the Enlargements will not show Retouching or Defects on negatives.

The lens is the well known "Cooke Aviar" especially corrected for Mercury Vapour lighting.

The latest pattern is fitted with a wheel device for raising and lowering the camera.

	½-plate. £ s. d.	1/1-plate. £ s. d.
No. I. Special ½-plate Enlarger with Cooke Aviar F/4·5 lens and Mercury Vapour Lighting, complete ... ... D.C.	45 0 0	—
A.C.	47 10 0	—
No. Ia for ½-plate or smaller; **No. IIa** for 1/1-plate or smaller, fitted with F/4·5 Cooke Aviar and Mercury Vapour lamp ... D.C.	53 5 0	62 12 0
A.C.	55 15 0	65 12 0
No. Ic for ½-plate; **No. IIc** for 1/1-plate, fitted with F/4·5 Wray Lustrar Anastigmat lens and 8½" respectively 11" condenser, D.C. or A.C. ...	36 15 0	44 2 0
No. IIIa for 10 × 8 or 12 × 10 negatives with Mercury Vapour Lamp, without lens ... ... D.C.	64 0 0	A.C. 67 10 0

Enlargements up to 40" × 30". Reductions to smallest size.
Floor space, 40" × 36". Height from 7½ ft. to 9 ft.

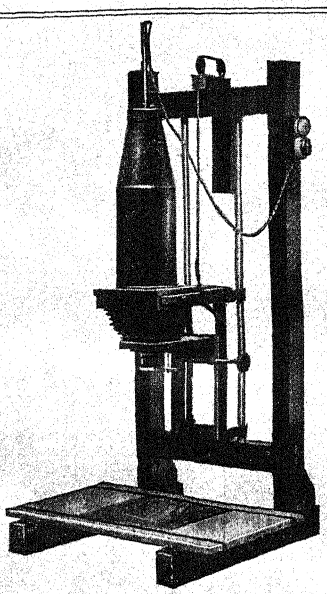
The price for Enlargers includes in every case all the lamps required, and Mercury Vapour outfit.
Extra for masking device on table: Up to 15 × 12, **£2 10 0**; up to 20 × 16, **£2 17 6**
The slides will take either glass or film negatives in correct register.

Manufacturers—

O. SICHEL & Co., 52, Bunhill Row, London, E.C.1

Telegraphic Address } Framework, London.
Cable Address }

Telephone: Clerkenwell 1226.
A.B.C. Code, 5th and 6th Edition.



"SICKLE" JUNIOR VERTICAL ENLARGER

¼-PLATE SIZE.

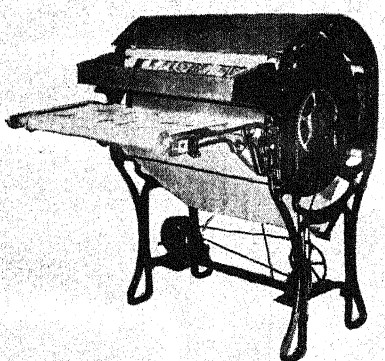
For professional use and D. & P. worker. 5 in. Wray F/4.5 Lustrar Anastigmat lens and 5½ ins. condenser. Will enlarge up to 20 × 16 from glass or film negatives; can be placed on any work table.

Price **£13 10 0**

POST CARD SIZE.

When larger negatives than ¼-plate are used this Enlarger should be a great boon to the Professional or D. & P. worker. Fitted with Wray Lustrar 6 in. F/4.5 lens and 7 ins. condenser.

Price **£18 10 0**



THE

1932 "SICKLE" PRINT DRYER

With Positive Drive throughout.

THE BEST FOR D. & P. WORKER
NO EQUAL FOR PRESS WORK

The best machine on the market. Speed from 2½ minutes to 5 minutes. according to work required. Creeping of drying band has been entirely eliminated. Capacity 3,000 prints per hour. Height, 48". Width, 36". Depth. 44". Width of band, 27".

THE "SICKLE" JUNIOR DRYER

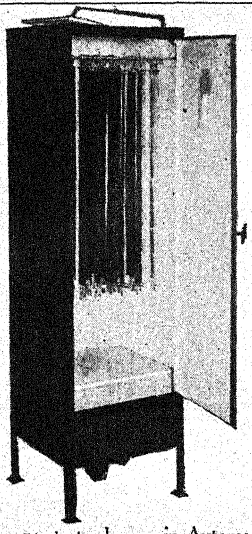
Height, 38". Width, 24". Depth, 30". Width of Band, 18".

Constructed on identical lines; there is no better machine for the small user.

	Prices. Large Model.	Junior Model.
Hand-driven, gas-heated	£25 0 0	£16 0 0
Motor-driven, D.C., gas-heated	£32 0 0	£19 10 0
,, ,, A.C., ,, ...	£34 10 0	
Electrically heated ... ... extra	£2 0 0	£2 0 0

Manufacturers—

O. SICHEL & Co., 52, Bunhill Row, London, E.C.1



"SICKLE"
FILM DRYING CABINET

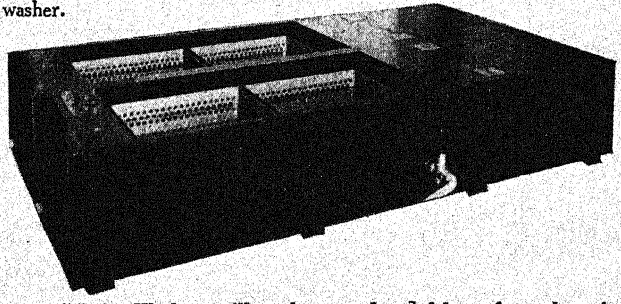
This Cabinet has been constructed on an entirely new principle of heating. The air being drawn through an opening in the bottom of the Cabinet through an electrically heated gauze blanket and fitted with an electric fan.

It is made up in two models, viz.: Single and Double, the capacities being 40-50 Roll Films, and 80-100 respectively. All sizes up to P.C. can be taken. In the double model either of the two sections can be operated separately. The Cabinet is made of heavy gauge metal and is of very high quality

Single Cabinet	£14 10 0
Double „	£22 10 0

"SURGE"
PATENT PRINT WASHER.

The greatest advance in Automatic Print Washing which does the job thoroughly, without handling or stirring and gives the utmost economy in water consumption. Effective agitation is provided by a motor driven paddle (consumption 1 unit in 16 hours) ensuring chemically thorough washing in 20 minutes. Technically designed to give a regular flow of water amongst the prints which are carried in Monel Metal perforated baskets, enabling direct transfer from fixing bath to washer.



"Surge" Print Washers will wash every drop of hypo from the prints.

Single Model, with two baskets (as illustrated), to wash 700 prints an hour	£25 0 0
Double Model, with four baskets, capacity 1,400 an hour	£40 0 0
Extra baskets, round or square pattern ... ... each	£1 10 0

Manufacturers—

O. SICHEL & Co., 52, Bunhill Row, London, E.C.1

COMBINED PRINT DRYING

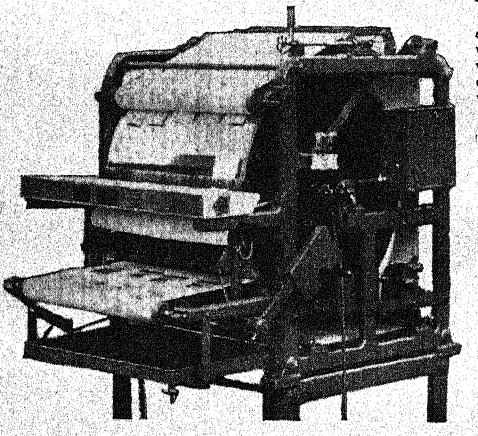
AND

GLAZING MACHINE.

SYSTEM "GERSTER" LATEST MODEL WITH SOLID CHROME STEEL CYLINDER.

PLATE GLASS, FERROTYPE PLATES and DRYING CUPBOARDS *ENTIRELY ELIMINATED*, ALSO ALL LABOUR IN CONNECTION THEREWITH.

This machine will not only dry paper or card thick prints, but also glazes them, or turns them out in the original surface in from 3 to 7 minutes respectively, with the simplest possible manipulation.



The machine can be heated either by gas or electricity in five to ten minutes.

If a glossy surface is required the prints are placed with the picture side upwards on the band, if with original surface the reverse way.

The high glaze is produced by pressure of the prints by means of the solid rubber squeegee roller against the highly polished surface of the drum until they fall off when dry, after one rotation of the drum.

The material used is of the greatest durability and the cylinder made of solid chrome steel, not of thinly coated material liable to oxydise or peel off.

The band can be easily removed for cleaning purposes with the utmost simplicity.

The chrome steel cylinder can be reburnished as new at small cost after several seasons' wear.

Regulation of speed and heat is provided for.

	Width of Cylinder.	Length of Machine.	Width of Machine.	Height of Machine.	Capacity.	
No. 0	10½ ins.	34 ins.	22 ins.	28 ins.	300–400	3¼ × 2½ per hr.
No. 1	18 ins.	40 ins.	37½ ins.	29½ ins.	750–1,000	,, ,,
No. 2	18 ins.	51 ins.	37½ ins.	40 ins.	1,500–2,000	,, ,,
No. 3	25 ins.	51 ins.	44½ ins.	65 ins.	2,250–3,000	,, ,,

PRICES ON APPLICATION.

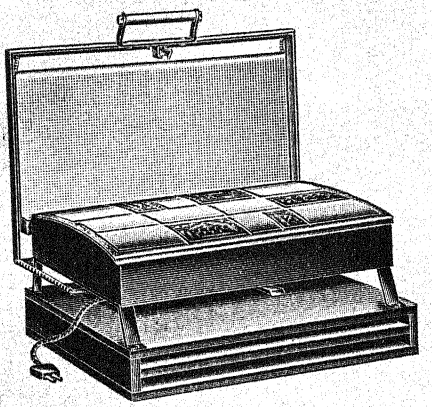
The No. 3 Model is supplied complete with Iron Stand.

Capacities for other Print Sizes or Postcards in proportion.

Manufacturers—

O. SICHEL & Co., 52, Bunhill Row, London, E.C.1

The "Gerster" Glazing Press



Specially Designed for Small D. & P. Works not affected by the Factory Act.

Designed on scientific lines. The convex curve of the heating plate ensures perfect pressure over the whole surface of the glazing plates.

The thin blanket, which is held in spring tension, is made of durable cloth material allowing the moisture to disperse in the quickest possible time, glazing being effected in from three to four minutes.

Supplied complete with platform, two glazing plates, flex and plug.

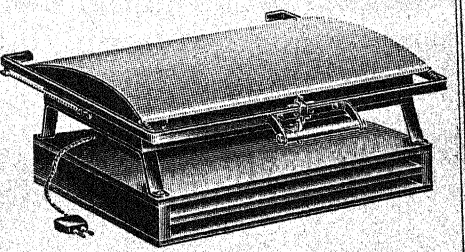
Model No. 1.

Plate size 13" × 21"
400 capacity p.h., 3¼ × 2¼ prints
Price **£15 0 0**

Model No. 2.

Plate size 18" × 24"
600 capacity p.h. 3¼ × 2¼ prints
Price **£17 10 0**

When Ordering please state Voltage.



ENAMELLED STEEL DISHES.

	s.	d.		s.	d.
7 × 5	2	6	15 × 12	8	6
9 × 7	3	0	20 × 16	15	0
10 × 8	4	0	24 × 19	20	0
12 × 10	5	0			

STRIP DISHES.

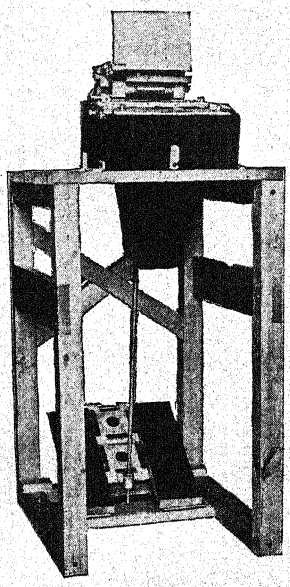
23 × 7 × 3 ... ... **8/6 nett.**

O. SICHEL & Co., 52, Bunhill Row, London, E.C.1

Telephone: **Clerkenwell 1226.** Telegrams: **"Framework, London."**

"KEEN" PRINTER

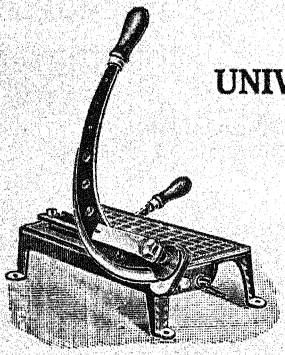
(Patent applied for).



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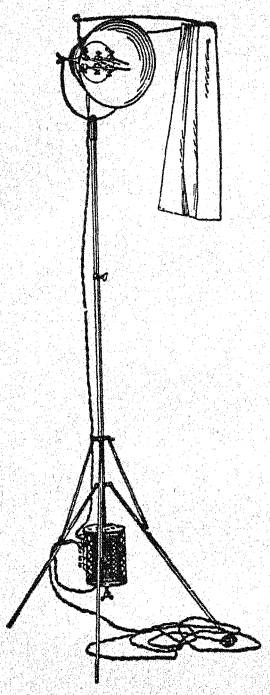
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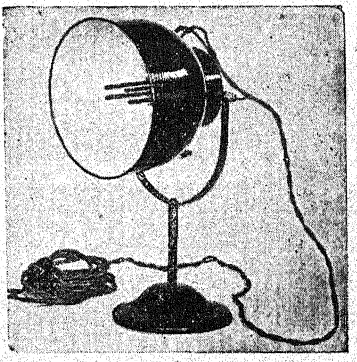


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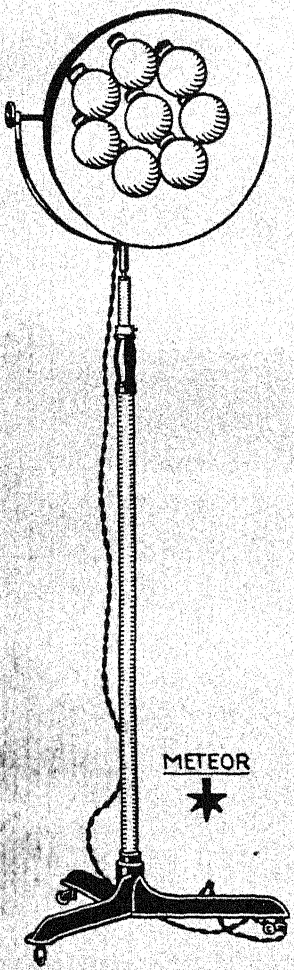
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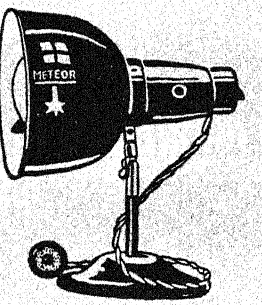
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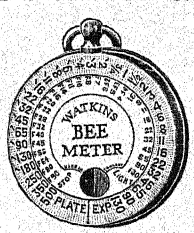
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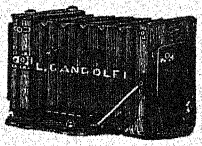
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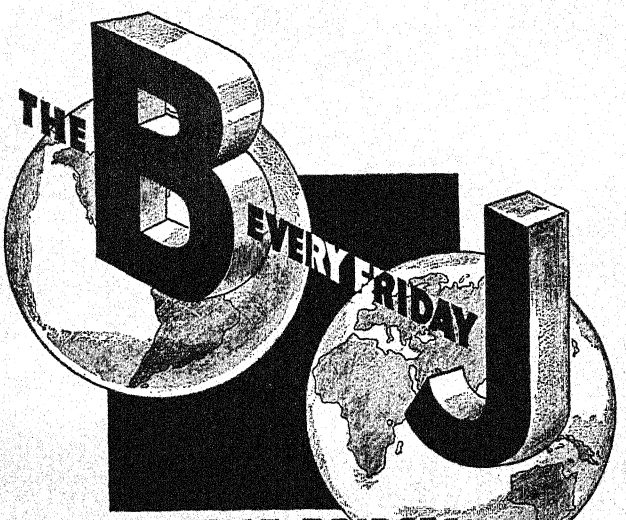
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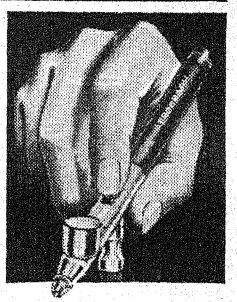
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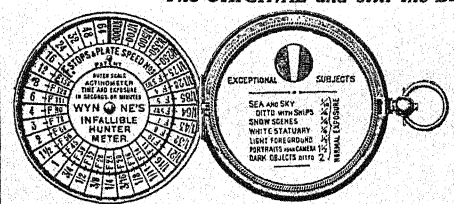
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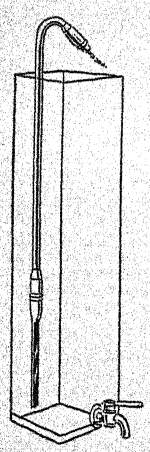
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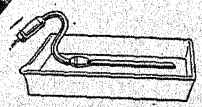
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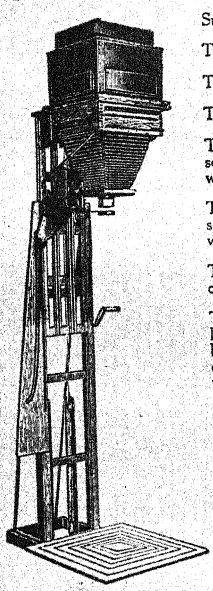
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The woodwork is of selected teak with all moving parts of brass giving very smooth and accurate working, making these enlargers the easiest and most satisfactory of all to operate. Accurate and simple automatic focussing mechanism without intricate parts to get out of order. They are truly universal, enlargements up to 6 or 7 diameters according to focal length of lens—copy full size—reduce to one-third original size. These enlargers never fail to give satisfaction and are recommended by every purchaser. Maximum overall height when full extended 6' 6" in the No. 1, 7' 9" in the No. 2. Size of detachable base-board 25" × 23" in the No. 1, 41" × 25" in the No. 2.

PRICES.

	No. 1 "M.V. Universal" enlarger.	No. 1 "B.L. Universal" enlarger.	No. 1 "C.L. Universal" enlarger.	No. 2 "M.V. Universal" enlarger.	No. 2 "B.L. Universal" enlarger.	No. 2 "C.L. Universal" enlarger.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Without projection lens ...	28 10 0	20 10 0	22 0 0	36 0 0	27 10 0	32 10 0
With Aldis F/6·3 lens ...	32 15 0	24 5 0	26 5 0	43 5 0	34 15 0	39 15 0
With Cooke Aviar F/4·5 lens	38 15 0	30 5 0	32 5 0	48 0 0	39 10 0	44 10 0

Extra cost for A.C. supply for the "M.V. Universal" enlarger **£2 10s. 0d.**

Extra cost for Table 30" high, **£2 10s. 0d.**

The Aldis F/6·3 lens in the No. 1 is of 7½" focus and 10" focus in the No. 2.

The Cooke Aviar F/4·5 lens is of 8¼" focus in the No. 1 and of 10" focus in the No. 2.

Customers having their own lens fitted must send lens to us to enable us to correctly set the automatic focussing mechanism.

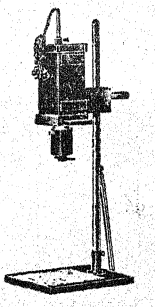
Full particulars will be gladly sent post free on request.

J. LANCASTER & SON, LTD., 87, PARADE, BIRMINGHAM.

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"CRESCO" VERTICAL ENLARGER



No. 1.—Condenserless model for cine, "Leica" or 3×4 cm. film negatives. Illumination by opal electric lamp. For enlargements up to and including 8½"×6½".

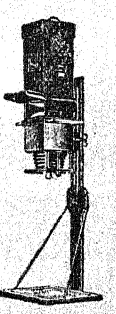
No. 2.—With 2½" dia. condenser lenses for gas or electric illuminant. For cine, "Leica" or 3×4 cm. negatives. For enlargements up to and including 12"×10".

No. 3.—With 4" dia condenser lenses for gas or electric illuminant. For 1⅝"×2", 2½"×2½" or 3"×2" film negatives. For enlargements up to and including 12"×10".

Enamelled iron light chamber. Strong brass tube vertical upright. Brass telescopic extension tubes with sliding focussing and fine screw final adjustment.

PRICES.	No. 1 Model. £ s. d.	No. 2 Model. £ s. d.	No. 3 Model. £ s. d.
With flange to take customers' own Leica lens	2 10 0	3 0 0	—
With Achromat lens	2 15 0	3 5 0	3 15 0
With F/6.3 Wray "Lustrar" ...	4 10 0	5 0 0	5 10 0
With F/4.5 Wray "Lustrar"	5 10 0	6 0 0	6 10 0
With F/3.1 "Cooke" ...	6 5 0	6 15 0	—

LANCASTERS' No. 2 "AMPLUS" ENLARGER



For electric or gas illuminant is supplied in three Forms.

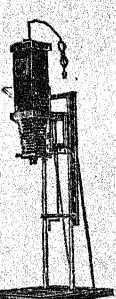
Form A.—For use with customers' own camera and lens.

Form B.—With bellows adjustment for use with customer's own lens.

Form C.—With achromat or anastigmat lens complete 4¼" dia. plano-convex condenser lenses in the 3½×2½ size and 5½" dia. in the ½-pl. size. Maximum size of paper baseboard will take is 12×10.

PRICES.	Form A. £ s. d.	Form B. £ s. d.	Form C. with achromat lens. £ s. d.	Form C. with F/6.3 anastigmat. £ s. d.	Form C. with F/4.5 anastigmat. £ s. d.
3½×2½ ...	2 12 6	3 7 6	3 17 6	5 2 6	6 2 6
½-Plate ...	3 15 0	4 10 0	5 0 0	6 10 0	7 10 0

LANCASTERS' No. 4 "AMPLUS" ENLARGER



For electric or gas illuminant is also supplied in the three Forms as above and in the Form B and C is semi-automatic focussing, scales and pointers being fitted for enlargements from 1½ to 4 times magnification. Woodwork of selected polished Teak with brass tube uprights. The body portion is raised and lowered by strong quick-thread brass screw. Strong brass supports to back. Detachable diffusing screen for use with the condenser lenses and a flashed opal diffusing screen is also supplied for use without condenser lenses when extra soft enlargements are desired. Extra long bellows extension for reducing to any size. Maximum size of paper baseboard will take is 15" × 12" in the 3¼ × 2½ and ½-pl. sizes and 20" × 16" in the postcard and ½-pl. sizes. 4½"dia. condenser lenses in the 3½ × 2½ size, 5½" dia. in the ½-pl. size, 6½" dia. in the postcard size and 8½" dia. in the ½-pl. size.

PRICES.	Form A. £ s. d.	Form B. £ s. d.	Form C. with F/6.3 anastigmat. £ s. d.	Form C. with F/4.5 anastigmat. £ s. d.
3½ × 2½	5 0 0	6 0 0	7 15 0	8 15 0
½-plate	6 15 0	7 15 0	9 15 0	10 15 0
5½ × 3½	8 10 0	9 15 0	12 10 0	14 15 0
½-plate	12 0 0	13 10 0	16 17 6	19 10 0

Extra cost for **Lancaster's "Special"** masking carrier for any of the above enlargers, 3½ × 2½, **10/6**, ½-pl. **12/6**. Postcard, **15/-**, ½-pl., **17/6**.

Fully Illustrated List of the best range of vertical and horizontal enlargers on the market will be sent post free on request to Dept. B.J.

J. LANCASTER & SON, LTD., 87, PARADE, BIRMINGHAM.

LANCASTERS, LANCASTERS,

An Invitation

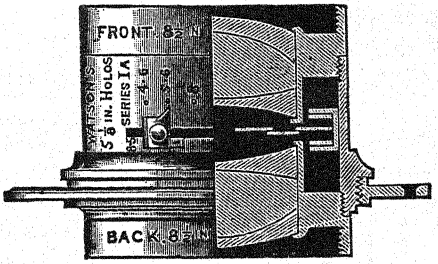
Every overseas reader of the "Almanac" who is not a regular subscriber to the "British Journal of Photography" (published weekly) is asked to note particularly the special

"B.J." OVERSEAS NUMBER

which is issued in June each year. This special number of the "B.J." is posted free to photographers in all parts of the world, and any overseas reader of the "Almanac" may receive a copy of the 1932 edition by sending a postcard to the Overseas Manager, 24, Wellington Street, Strand, London, England.

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WATSON'S HOLOSTIGMAT F/9

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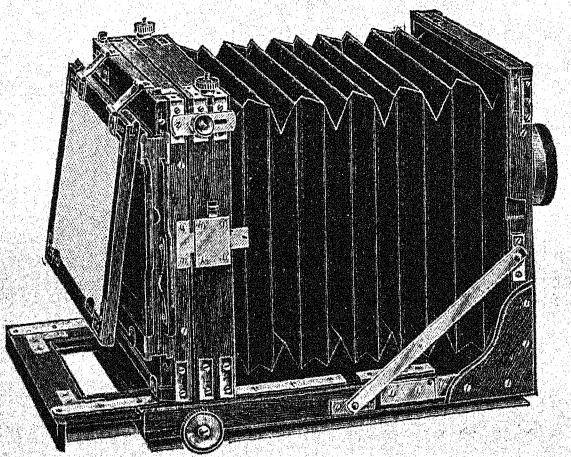
W. WATSON & SONS, LTD.

313 High Holborn, London, W.C.1

Works: Barnet *Established 1837*

"PREMIER" CAMERA

FOR PROFESSIONAL USE



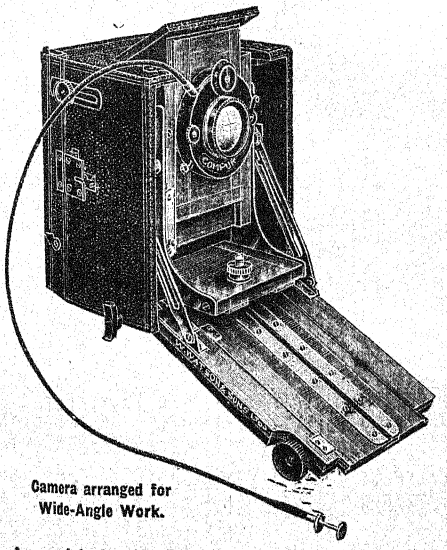
WATSON'S "PREMIER" CAMERA IS IDEAL FOR :—
PORTRAITS, GROUPS, BUILDINGS, STRUCTURES,
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WORKS OF ART & SPECIMENS

Descriptive Catalogue sent on request

W. WATSON & SONS, LTD.
313 High Holborn, London, W.C.1

Works : Barnet *Established 1837*

"ALPHA" CAMERA
DE LUXE



Camera arranged for Wide-Angle Work.

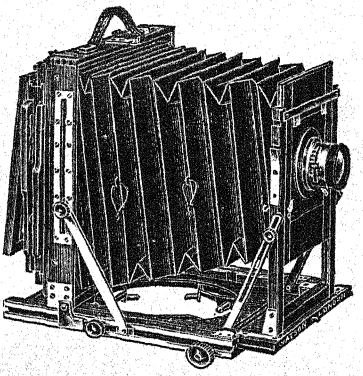
Watson's "Alpha" Camera is suitable for hand or stand. Although easily manipulated and convenient as a hand camera it has all the useful movements of a field camera: reversing back, swing motions to back and front, rising front and double extension. It has also a drop front for wide-angle work.

The "Alpha" Camera is made by the most experienced makers of cameras in the world. Material and workmanship are perfect.

Description and prices sent on request

W. WATSON & SONS, LTD.
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Works: Barnet *Established 1837*

"ACME" CAMERA

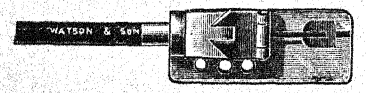


Watson's "Acme" is a portable stand camera, made in all sizes from half-plate to 15″×12″. It is provided with turn-table in base with lock, reversing back and every useful movement. It is made by the most skilful workmen.

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The original metal release for all shutters



For Thornton-Pickard and other makes of roller-blind Shutter.



For all Diaphragm Shutters provided with screw fitting for attachment, such as Compound, Acme, Lukos.



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Stock length (9″) or to 24″ to order, Price 2s. 6d.
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Special patterns and lengths to order

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C. BAKER

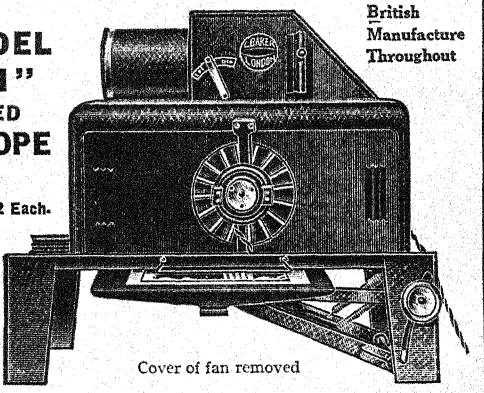
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Lamps Extra - £2 Each.

More light, cooler, simpler, and cheaper than any other fan-cooled model.

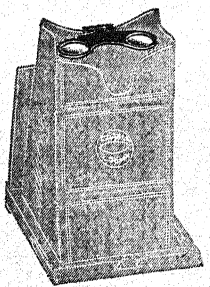
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British Manufacture Throughout



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Simple Changing from EPI to Diascopic by means of lever.
F 3.5 Anastigmat Lens used for both EPI and Diascopic Projection.
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IT FOLDS INTO THE HOOD

The METRON BINOCULAR FOCUSSER

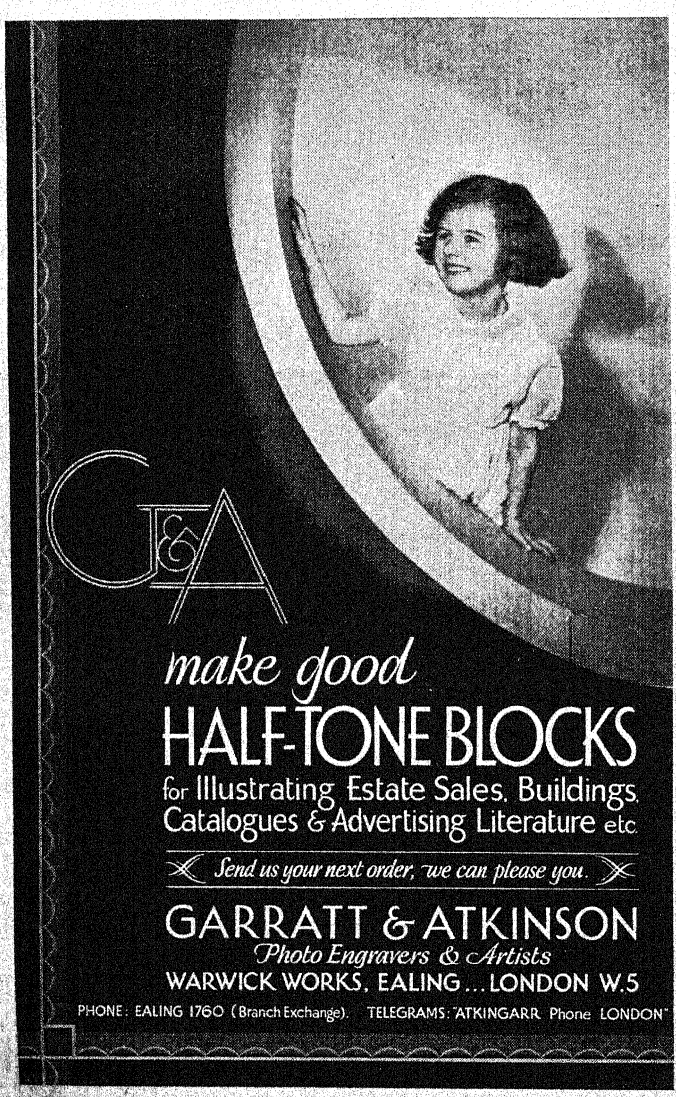
has been designed to overcome the difficulty of critical focussing so essential with the big-aperture lenses of to-day. THE METRON BINOCULAR FOCUSSER is not a spare part, it clips on to the hood of your Reflex, and need not be removed.
Size: 3⅜ in. long; 1¼ in. back to front; 3/16th in. thick.
THE METRON BINOCULAR FOCUSSER gives a clearly-defined single image. *It is British made in our own Scientific Instrument factory.*

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Lists sent on request. All Apparatus Guaranteed.

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CINEMA CAMERAS, PROJECTORS AND SCIENTIFIC APPARATUS OF EVERY DESCRIPTION

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Superb workmanship and finish.

THE ADAMS MINEX

The Adams MINEX is the greatest advance ever made in Reflex Camera construction.

THE ADAMS FOLDING MINEX

The most Compact Folding Reflex with long extension and all movements, as rigid as a Box-form Minex.

THE MOST PERFECT STUDIO CAMERA EVER INVENTED.

THE ADAMS STUDIO MINEX

Embodying every feature required in a high-class up-to-date Reflex.

THE ADAMS VESTA

Folding Pocket Camera. Every feature the most fastidious can demand.

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Folding Double-Extension Camera. Highest Finish.

All Apparatus manufactured throughout at our own factories under expert supervision and scientifically tested. Cameras constructed and experimental work carried out to customers' specifications.

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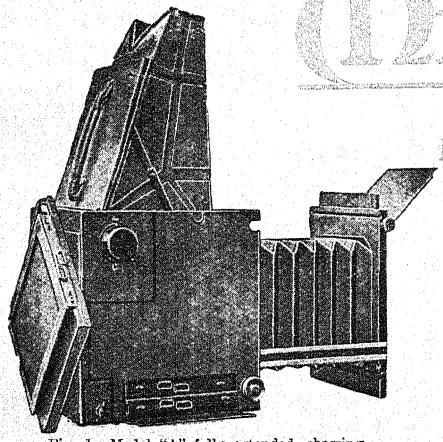


Fig. 1—Model "A" fully extended, showing Revolving Back with double dark slide in position. Other two in bottom of Camera.

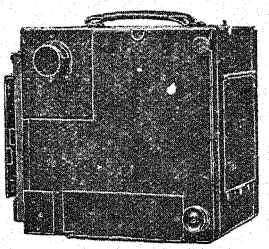


Fig. 2.—Model "A" closed and showing Right Side and Front. Dark Slide Chamber at bottom.

MINEX

Improved 1932 Model "A" de Luxe

The Adams MINEX holds an unparalleled reputation, and stands for all that is best in Reflex Instruments, and is everywhere acknowledged to be the standard Reflex Camera of the world. It has revolutionized Reflex Camera construction, being the first to start an era of improvement that has benefited the users of such instruments everywhere. It was only introduced after actual prolonged trial, and was not put forward until its improvements were found to be of real and practical value.

Being the pioneers of Reflex Cameras, we were the first to design the triple focussing hood, and also the now well-known revolving back, with automatic masking device, both of which have been imitated by many manufacturers.

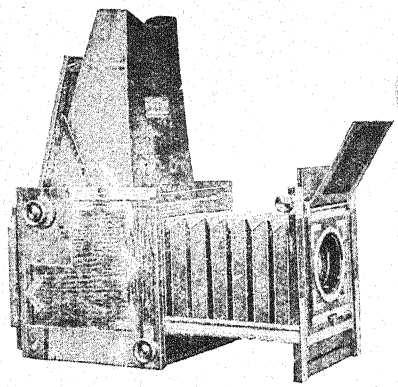
The Minex self-capping focal plane shutter is the simplest and most reliable of all focal plane shutters and works at variable speeds from $\frac{1}{1000}$th to $\frac{1}{2}$th second, and by using pneumatic ball and tube with time valve, exposures of 3, 2, 1, $\frac{1}{2}$ and $\frac{1}{4}$ second can be obtained. Alteration of speed is effected before or after setting the shutter by placing setting knob against desired speed on dial.

An important feature introduced in the 1932 Model consists of a locking device fitted to the mirror action by which means the mirror can be thrown out of action and shutter set and released independently if desired, enabling the use of short focus wide angle lenses. This also allows camera to be used at eye level in conjunction with a direct brilliant or other finder. Focussing can be effected on back ground glass screen when mirror is locked out of position. All the other well-known refinements which have made the Minex Camera the most perfect Reflex Camera ever produced are embodied. Constructed of the very best materials obtainable entirely by hand by highest skilled craftsmen.

PRICES.

	Camera and three double dark slides.	Fitted with F4.5 Ross Xpres Lens.	Fitted with F5.5 Ross Combinable.
$3\frac{1}{4} \times 2\frac{1}{4}$ *or* $6\frac{1}{2} \times 9$ c.m.	£50	£57 10 0	£63 10 0
$\frac{1}{4}$ Plate	£55	£63 10 0	£70 2 6
5×4 *or* 9×12 c.m.	£60	£71 0 0	£76 2 6
$\frac{1}{2}$ Plate *or* 10×15 c.m.	£70	£84 10 0	£89 15 0

Any other suitable lens can be substituted at proportionate price.
Four-Way Swing Front fitted to selected lens, **55/-.**



Tropical Model "A"

de Luxe TROPICAL MINEX

1932

IMPROVED

TROPICAL MODEL.

POLISHED TEAK.

BRASS BOUND.

The Tropical Model embodies all the features of the Model "A" de Luxe, including the Minex self-capping focal plane shutter, automatic masking device, revolving back and the new locking device to mirror action, being specially constructed for varying tropical climates; the body is made of seasoned selected teak, fully brass bound and polished.

Revolving back and other fitments of hardened brass, shutter springs lacquered and copper gilded to prevent corrosion from climatic conditions. Hood and bellows being of finest calf leather, Russia finished.

Organisers of many of the important expeditions have selected the Minex camera for its known reliability under most trying conditions, and is largely used by travellers and residents in foreign countries. The Minex focal plane shutter being of simple construction, very reliable and easy of adjustment, combined with the general high-class workmanship of the camera, recommends it for all purposes.

PRICES.

	Camera and three double dark slides.	Fitted F4.3 Ross Xpres.	Fitted F3.5 Ross Combinable.
$3\frac{1}{4} \times 2\frac{1}{2}$ *or* $6\frac{1}{2} \times 9$ c.m.	£70	£77 10 0	£83 10 0
$\frac{1}{4}$ Plate	£75	£83 10 0	£90 2 6
5 × 4	£80	£91 0 0	£96 2 6
$\frac{1}{2}$ Plate *or* 10 × 15 c.m.	£90	£104 10 0	£109 15 0

Tropical Four-Way Swing Front fitted to lens selected, 75/-.

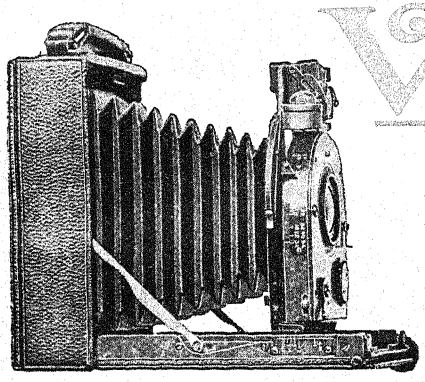
General Information.

We can supply any make of suitable lens with our Minex cameras and will be pleased to give quotations upon receipt of requirements.

Approximate measurements and extension of a Minex de Luxe and Tropical Models.

	High.	Wide.	Long.	Extension, Plate to Camera front. In.	Measured from back of lens mount to plate. Shortest, about ins.	Longest, about ins.
$3\frac{1}{4} \times 2\frac{1}{2}$ *or* $6\frac{1}{2} \times 9$ c.m.	$6\frac{1}{2}$	5	$6\frac{3}{4}$	10	4	11
$4\frac{1}{4} \times 3\frac{1}{4}$ - - - - -	$7\frac{1}{4}$	$5\frac{1}{2}$	$7\frac{1}{2}$	$12\frac{1}{2}$	$4\frac{1}{2}$	$13\frac{1}{2}$
5 × 4 *or* 9 × 12 c.m.	$7\frac{3}{4}$	$6\frac{1}{2}$	8	$13\frac{3}{4}$	$5\frac{1}{8}$	15
10 × 15 c.m. - -	$8\frac{1}{2}$	$7\frac{1}{2}$	9	16	$6\frac{3}{8}$	$17\frac{1}{2}$
$6\frac{1}{2} \times 4\frac{1}{4}$ - - - - -	$9\frac{1}{2}$	$7\frac{3}{4}$	$9\frac{1}{4}$	17	$6\frac{3}{4}$	18

The extension required for a Telephoto Lens is about half its equivalent focus.



Model "A" for Plate, Film Pack or Cut Films.

The Ensign VERTO

The Verto Camera is largely favoured on account of its great utility, being double extension, allowing the use of the single components as well as the Combined Lens. Strongly constructed of aluminium alloy and hardened brass, covered with fine grain morocco leather. A valuable feature is the Revolving Front, by which means the Identoscope Finder, giving accurate view is always exactly over centre of lens. Extreme Rising Front for Vertical and Horizontal pictures.

Focussing scale engraved for single and combined lenses. The camera is fitted with Ross Combinable Lens working at F5.5 and mounted in high grade between lens shutter speeded $\frac{1}{250}$ to 1 second, time and bulb.

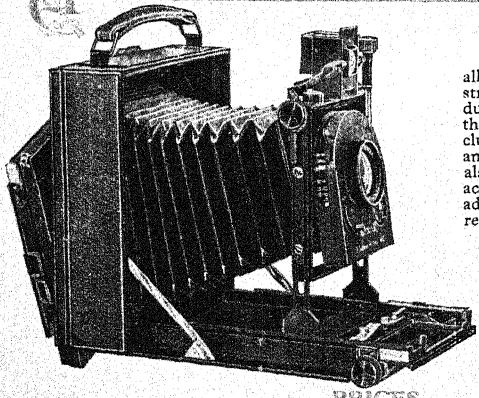
PRICES including hooded focussing screen and film pack adapter.

$3\frac{1}{2} \times 2\frac{1}{2}$ (6½ × 9 c.m.)	4 inch F5.5 Ross Combinable Lens	...	...	...	...	...	£37	0	0
$4\frac{1}{4} \times 3\frac{1}{4}$	$5\frac{1}{2}$	,,	,,	,,	,,	,,	...	...	...	...	...	£40	0	0
$5\frac{1}{2} \times 3\frac{1}{2}$	6	,,	,,	,,	,,	,,	...	...	...	...	...	£45	0	0

Entirely New Model 1932.

The Ensign VERTO

Square Body Revolving Back.



This new model Verto embodies all the important features and strong construction, and is produced with the same accuracy as the ordinary Verto Camera, including the long double baseboard and extremely rigid front, it has also a rising and swing front actuated by a fine micrometer rack adjustment. Adams well-known revolving back also embodied.

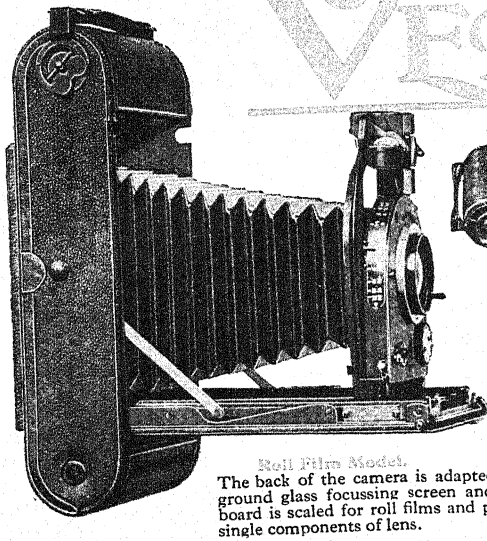
This model will be found most useful to the serious worker who wishes a camera of portability and unlimited capability for every class of photography. Perfectly and scientifically constructed with the same accuracy and precision as all our apparatus

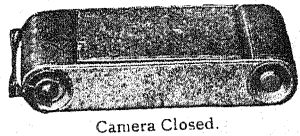
PRICES.

$3\frac{1}{2} \times 2\frac{1}{2}$ with	$4\frac{1}{4}$ Ross Combinable Lens F5.5	...	...	...	£47	0	0
$4\frac{1}{4} \times 3\frac{1}{4}$,,	$5\frac{1}{2}$	,,	,,	,,	...	...	...	£50	0	0
5×4 *or* $5\frac{1}{2} \times 3\frac{1}{2}$	6	,,	...	...	...	...	...	...	...	...	£55	0	0

Prices include three double dark slides.
Verto collapsible lens hoods 25/- extra, all sizes.

THE ROLL FILM VERTO





Camera Closed.

NEATEST AND MOST COMPACT DOUBLE EXTENSION ROLL FILM CAMERA PRODUCED.

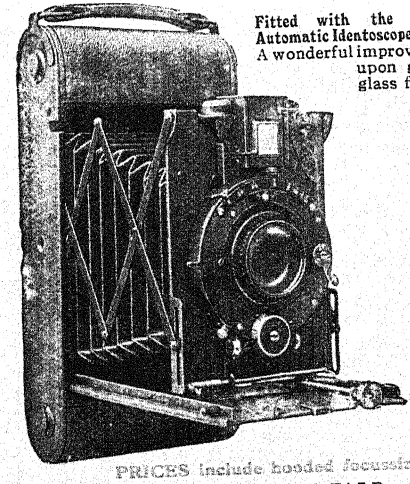
THE ROLL FILM VERTO is constructed in the same manner and embodies all the features of the film pack and plate model as specified on preceding page.

Roll Film Model.

The back of the camera is adapted without alteration for use with ground glass focussing screen and double dark slides. The base-board is scaled for roll films and plates, for both the combined and single components of lens.

PRICES.

$3\frac{1}{2} \times 2\frac{1}{2}$ ($6\frac{1}{2} \times 9$ c.m.)	4 inch F5.5 Ross Combinable Lens ...	£42	0 0
$4\frac{1}{4} \times 3\frac{1}{4}$	$5\frac{1}{2}$ " " " " " " ...	£45	0 0
$5\frac{1}{2} \times 3\frac{1}{2}$	6 " " " " " " ...	£50	0 0



Fitted with the Adams Automatic Identoscope Finder
A wonderful improvement upon ground glass finders.

De Luxe Roll-Film VESTA

The Vesta Roll Film Camera is still the most popular of highest class roll film cameras.

The accuracy and stability with which the Vesta Cameras are constructed, combined with simplicity, ensures reliability under all conditions.

The back of camera is adapted without alteration for use with ground glass focussing screen and double dark slides.

PRICES.

$3\frac{1}{2} \times 2\frac{1}{2}$	$4\frac{1}{4}$ inch F4.5 Ross Xpres Lens	£30	0 0
$4\frac{1}{4} \times 3\frac{1}{4}$	$5\frac{1}{2}$ " " "	£33	0 0
$5\frac{1}{2} \times 3\frac{1}{2}$	$6\frac{1}{2}$ " " "	£38	0 0

PLATE AND FILM PACK.

De Luxe Model.

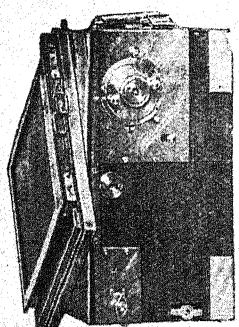
PRICES include hooded focussing screen and film-pack adapter.

$3\frac{1}{2} \times 2\frac{1}{2}$ ($6\frac{1}{2} \times 9$ c.m.)	$4\frac{1}{4}$ inch F4.5 Ross Xpres Lens	£25	0 0
$4\frac{1}{4} \times 3\frac{1}{4}$	$5\frac{1}{2}$ " " " " "	£27	10 0
$5\frac{1}{2} \times 3\frac{1}{2}$ (10 × 15 c.m.)	$6\frac{1}{2}$ " " " " "	£35	0 0

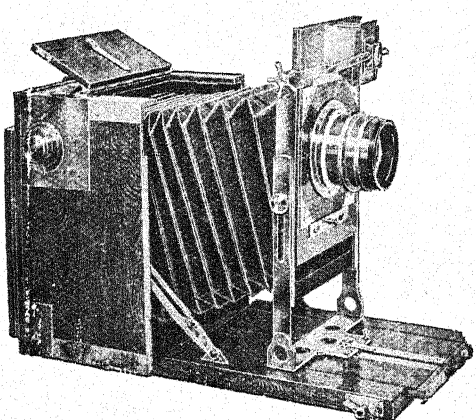
The Adams Vaido

An Instrument of Superb Construction, Great Precision and Thorough Reliability.

The Universal Camera for the expert, embracing every movement. Adapted for all branches of photography. Ideal for Architectural subjects.



Tropical Model closed, showing Adams Revolving Back and Minex Shutter.



Showing Rising Front.

THE ADAMS VAIDO is the most perfect example of the well-known type of hand and stand cameras, it is a great advance upon cameras of similar style. It dispenses with the very complicated lever slotted systems used by many makers, and yet retains in a far simpler form **ALL** their advantages without their serious defects. We were the originators of the revolving back upon Hand Cameras, and this is applied in its most perfect form. It has the advantage of being fitted with our new MINEX self-capping Focal Plane Shutter, giving speeds from $\frac{1}{1000}$th to 3 seconds, no other shutter is necessary, and any variety of lenses from wide angle to very long focus or telephoto lenses may be used, and quickly changed from one lens to another.

SWING AND RISING FRONT. Double rising front provided, the first being rack and pinion. A still greater rise of some inches also provided, essential for architectural work.

Adams REVOLVING Back is also fitted same as on "MINEX."

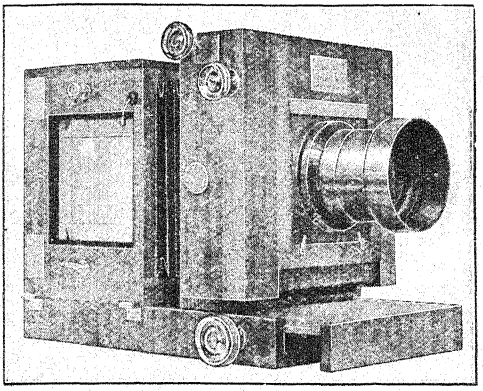
LENSES. Any Maker's suitable lenses may be fitted, from Wide Angle to Telephoto.

FOCUSSING. Accurately scaled to one or more lenses. Hooded Focussing Screen. Separate rack focussing for wide angle lenses.

PRICES.

Size.	Approximate Measurements including Revolving Back High	Wide	Thick	Extension from Screen to Lens Board.	Mahogany, covered Black Morocco.	Polished Teak Tropical Model Brass Bound.
3¼ × 2¼	5¼ in.	5 in.	3½ in.	12 in.	£36 0 0	£46 0 0
¼ pl.	6⅝ ,,	5½ ,,	3½ ,,	13 ,,	£40 0 0	£50 0 0
½ or 9 × 12 c.m.	7 ,,	6½ ,,	3⅝ ,,	16½ ,,	£45 0 0	£55 0 0
5¼ × 4¼	9¼ ,,	7¼ ,,	5 ,,	21 ,,	£50 0 0	£70 0 0

Above prices include three Double Dark Slides.



The Studio MINEX

NEW MODEL FITTED WITH SIDE SWING FRONT.

THE STUDIO MINEX REFLEX

Camera has been introduced owing to the demand from the leading professional photographers who have found the necessity of using a Reflex Camera in the Studio.

The Studio Minex Reflex specially recommends itself for all general portraiture, focussing and shutter adjustment being actuated at the side of camera, thus plate or film may be in position and when picture is correctly posed, shutter and mirror are simultaneously released and exposure made, thus obviating the delay which must occur by using the ordinary methods of first focussing then removing ground glass and inserting dark slides, during which time the sitter may have changed position and desired expression be entirely lost. The Studio Minex Reflex being fitted with Adams self-capping Minex focal plane shutter giving speeds of $\frac{1}{25}$, $\frac{1}{50}$, $\frac{1}{100}$, $\frac{1}{200}$ and $\frac{1}{400}$ second actuated by finger release or pneumatic ball and tube which also admits of automatic exposures of 3, 2, 1 second and long Bulb and Time exposures. Speeds of shutter may be adjusted before or after shutter is set according to requirements. Focussing screen shows full size picture, masks are supplied for smaller sizes. Very long extension actuated by continuous rack and second pinion, rack rising and swing front and reversing back, interchangeable lens panels supplied for use with various lenses. The Studio Minex Camera is constructed of well seasoned mahogany finished and polished in best style and presents a most attractive appearance in addition to its great utility.

PRICES.

With one double book-form dark slide, ½ plate	£75	0	0
Do. do. do. whole plate	£85	0	0
Extra ½-plate book-form double dark slides .. .. each	£2	15	0
Do. ¼-plate do. .. .. ,,	£3	10	0

Cut film holders same prices as double dark slides.

An entirely New Introduction this Season.

WE have produced an AUTOMATIC MAGAZINE to be used in conjunction with the Studio Minex Reflex, owing to the popularity of the increasing use of cut films by professional photographers for studio work. This changing box will carry any number up to 48 cut films at one loading, thus greatly facilitating rapid working in the studio. Exposed films may be removed as required without interfering with the unexposed.

PRICES.

For 48 cut films, ½ plate	£25	0	0
Do. do ¼ plate	£30	0	0

Small charge for fitting to customer's camera.

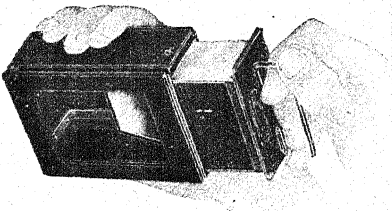
DAYLIGHT LOADING SYSTEM

ENTIRELY NEW MODEL ROLL HOLDER for standard roll films. Daylight loading, adapted for Camera made for double plate holders. $3\frac{1}{4} \times 2\frac{1}{4}$, £8 10s. 0d. Other sizes to order, prices on application.

THE ADAMS FILM PACK ADAPTER has been perfected by means of a new enclosed trap which effectually excludes any light reaching film pack during changing. Handsomely covered in morocco leather, can be supplied for all makes of cameras of same register

	$3\frac{1}{4} \times 2\frac{1}{4}$	$\frac{1}{4}$ pl.	$\frac{1}{2}$ pl.	$5\frac{1}{4} \times 3\frac{1}{4}$	$\frac{1}{2}$ pl.
Film Pack Adapters	25/-	30/-	35/-	35/-	40/-
Ditto, Brass-bound Teak	40/-	50/-	60/-	60/-	75/-
Hooded Focussing Screens	20/-	22/6	25/-	25/-	30/-
Graflex Daylight Loading Roll Holder, fitted to Camera	80/-	80/-	97/6	97/6	—
Ditto, Brass bound, Tropical	110/-	120/-	140/-	145/-	—

CHANGING BOXES



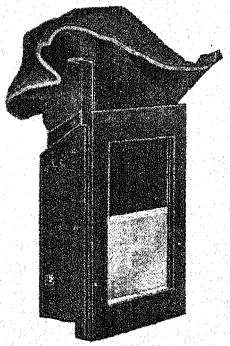
ADAMS AUTOMATIC CHANGING MAGAZINE.

An entirely new introduction adapted for plates and cut films.

When carrier is withdrawn next plate or film is in position for exposing. Can be fitted to all cameras adapted for double dark slides of standard register. Strongly constructed mainly of hardened metal and covered in best black morocco leather.

Prices for 12 cut films or 12 plates

$3\frac{1}{4} \times 2\frac{1}{4}$	$\frac{1}{2}$ plate.
£7 10 0	£8 10 0



The Adams Bag Changing Boxes.

Best manufacture, covered in best black morocco. Bags of special quality leather.

12 plates—$3\frac{1}{4} \times 2\frac{1}{2}$, **90/-**
$4\frac{1}{4} \times 3\frac{1}{4}$, **100/-**; 5×4, **110/-**;
$6\frac{1}{2} \times 4\frac{3}{4}$, **120/-**

12 Cut Films, $3\frac{1}{4} \times 2\frac{1}{4}$, **90/-**; $\frac{1}{4}$ pl., **100/-**;
5×4, **110/-**; $\frac{1}{2}$ pl., **120/-**

DARK SLIDES

	Mahogany, black polished.	Double book form.	Brass-bound, Teak.	Double book form—Teak
$3\frac{1}{4} \times 2\frac{1}{4}$ ..	18/6	30/-	30/-	37/6
$4\frac{1}{4} \times 3\frac{1}{4}$ ..	20/-	32/6	32/6	40/-
5×4 / 9×12 c.m.	25/-	37/6	37/6	45/-
$5\frac{1}{4} \times 3\frac{1}{4}$ ..	25/-	37/6	37/6	45/-
$6\frac{1}{2} \times 4\frac{3}{4}$ / 10×15 c.m.	32/6	45/-	45/-	50/-

Owing to the increased use of cut films, we have introduced this season double cut film holders and can supply at same prices as quoted for double dark slides.

All models of our cameras are made to same gauge and register, and accessories quoted on this page are interchangeable.

Lenses Recommended for use with our apparatus.

PRICES OF THE ROSS LENSES.

ROSS XPRES, F2.9.

Equiv. Focus.		Plate Covered.	Price. Iris or Sunk Setting.		
mm.	in.	in.	£	s.	d.
144	5⅝	3½ × 2½ & 4¼ × 3¼	15	10	0
165	6½	4¼ × 3¼ & 5 × 4	17	10	0
215	8½	5 × 4 & 6½ × 4¾	25	0	0
254	10	6½ × 4¾	35	0	0

ROSS XPRES, F4.5.

Equiv. Focus.		Plate Covered.	Price. Iris or Sunk Setting.		
mm.	in.	in.	£	s.	d.
120	4¾	3½ × 2½	7	0	0
127	5	4 × 3	7	10	0
140	5½	4¼ × 3¼	7	10	0
152	6	5 × 4	8	10	0
165	6½	5½ × 3½	10	0	0
184	7¼	6½ × 4¾	11	0	0
215	8½	7 × 5	14	10	0
254	10	8 × 5	20	0	0

ROSS TELEROS, 2-POWER F5.5.

Equiv. Focus.	Size Plate.	Price in Iris Setting.		
	in.	£	s.	d.
9 in. F5 5	3½ × 2½	11	10	0
11 ,, ,,	4¼ × 3¼	14	0	0
12 ,, ,,	5 × 4	15	5	0
13 ,, ,,	5½ × 3½	16	15	0
17 ,, ,,	6½ × 4¾	27	10	0
22 ,, ,,	8½ × 6½	47	0	0

TAYLOR-HOBSON COOKE LENSES.

F6.5 Series VIIB Wide Angle.

Approximate Equiv. Focus.	Plate Covered at F16.	Price.		
in.	in.	£	s.	d.
2⅔	4¼ × 3¼	8	0	0
3¼	5½ × 3½	8	0	0
4¼	7 × 5	8	0	0
5¼	8½ × 6½	8	10	0
6¼	10 × 8	9	10	0
8	12 × 10	11	10	0

ROSS XPRES, F6.5.

Equiv. Focus		Plate Covered.	Price. Iris or Sunk Setting.		
mm.	in.	in.	£	s.	d.
136	5⅜	4¼ × 3¼	11	10	0
152	6	4¼ × 3¼	12	15	0
165	6½	5 × 4	14	0	0
184	7¼	5½ × 3½	16	0	0
254	10	6½ × 4¾	30	0	0

ROSS COMBINABLE F6.5.

Complete Lens Focus	Single Components	Plate Covered.	Prices in Brass Setting with Iris.		
in.	in.	in.	£	s.	d.
4⅔	8	3½ × 3½	11	12	6
5⅓	9⅓	4¼ × 3¼	13	10	0
6	10½	5 × 4	15	2	6
6⅔	11¾	6 × 5	16	2	6
7¼	12⅔	6½ × 4¾	17	10	0
8½	14½	8 × 5	19	15	0
10	17	8½ × 6½	24	15	0

TELEROS 3-POWER F6.3.

Equiv. Focus.	Plate Covered.	Price in Iris Setting.		
in.	in.	£	s.	d.
9	2⅛ × 1⅝	11	10	0
13	3½ × 2½	14	10	0
17	4¼ × 3¼	22	0	0
25	6½ × 4¾	47	0	0

DALLON TELE-ANAS, F5.6.

Equivalent Focal Length.	Plate Size.	Price.		
in.	in.	£	s.	d.
10	3½ × 2½ - 4¼ × 3¼	12	0	0
12	4¼ × 3¼ - 5 × 4	14	0	0
14	5½ × 3½	17	0	0
17	6½ × 4¾	23	0	0
20	7 × 5	33	0	0
24	8½ × 6½	45	0	0

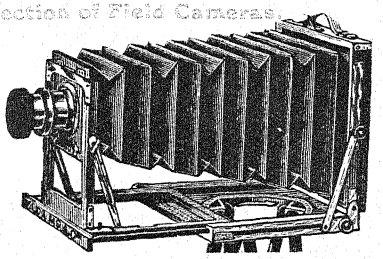
Our vast experience is always at customer's disposal in advising most suitable lenses for every kind of work.

All makes of lenses of suitable focal length can be fitted, but we strongly recommend customers to select British made lenses as being the most perfect optical instruments the world produces.

The Perfection of Field Cameras.

Adams 'CLUB'

ALL movements, but NO intricate complications. Best quality material and highest skilled workmanship.



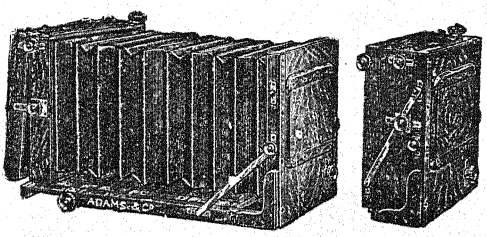
Light, portable, compact. Square reversing back, rising and falling front, swinging motion vertical and horizontal swing back. Back slides to front, to use wide angle lenses and double extension for long focus lenses. Thoroughly strong and rigid, and suitable for all work. Dark slides have stop springs to shutters. Has revolving turntable in base of camera for three-fold Tripod. Can also be made for stereo work.

PRICES.

	$6\frac{1}{2} \times 4\frac{1}{2}$	$8\frac{1}{2} \times 6\frac{1}{2}$	10×8	12×10	15×12
"Club" Camera, 3 double dark slides, turntable 3-fold tripod	£25 0 0	£30 0 0	£40 0 0	£45 0 0	£50 0 0
Brass binding, extra	3 3 0	3 15 0	4 4 0	5 5 0	6 10 0

Adams 'Challenge'

being our own Manufacture, is of the Best Quality and Workmanship.



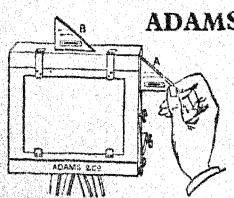
Made of finest seasoned mahogany, best leather bellows, long extension, double swing reversing back, rising and cross fronts, three best double bookform dark slides included.

The ideal camera specially suitable for groups, architectural, commercial, and engineering photography, extremely rigid and solidly built to withstand constant usage and capable of carrying long focus heavy lenses. For suitable lenses see page 79.

PRICES.

	$6\frac{1}{2} \times 4\frac{1}{2}$	$8\frac{1}{2} \times 6\frac{1}{2}$	10×8	12×10	15×12
Camera and 3 double slides ...	£24 0 0	£28 10 0	£34 0 0	£38 10 0	£46 0 0
Brass binding extra	3 3 0	3 15 0	4 4 0	5 5 0	6 10 0
Extra double slides	2 10 0	3 0 0	4 0 0	4 14 0	6 0 0
Solid Hide Case, Camera and 3 slides	5 0 0	5 10 0	7 0 0	9 0 0	10 0 0
Rule joint 3-fold Tripod Stand	3 3 0	4 4 0	5 5 0	5 5 0	6 6 0

ADAMS & CO.'S 'Challenge' Level



The only practical Level. When ordinary Level is placed on top of the Camera, it cannot be seen, being too high.

The "Challenge" Level is seen right through, and may be placed against *side* of Camera also against focussing screen to see it is truly perpendicular.

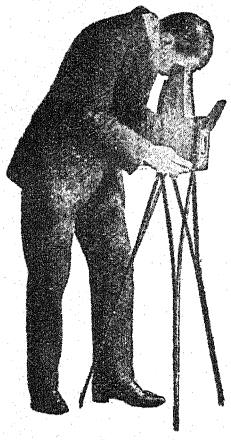
Small enough for vest pocket, and is most useful for all Cameras when used upon a stand.

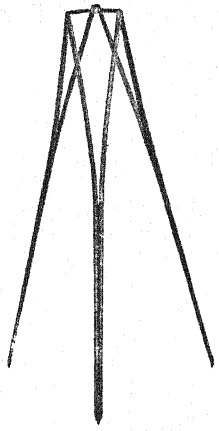
Price 4/6 each.

THE 'ADAMS' FOCUSSING MAGNIFIER.

A perfect achromatic Focussing Glass of high magnifying power, in best finished metal mount with locking ring so that user can adjust to suit own sight, extremely useful for accurate focussing. **Price 27/6.**

Adams' Walking Stick Tripod







A **self-contained** Tripod, which, when closed, forms a walking-stick, and **no part** has to be carried separately. Camera screw and tripod head which measures 5⅛ inches forms camera support, and opens automatically. Is rigid enough even for half-plate Reflex Camera.

The success of the ADAMS Walking Stick Stand is owing to the top of each leg being splayed out to the extent of the outside dimensions of the tripod top, similarly to the best forms of ordinary field camera tripods.

Full height.	Width of tripod head.	Weight about	PRICE.
36 ins.	5⅛ ins.	19 ozs.	**65/-**

Leather Slings for carrying on arm, **3/6**

Adams Portraiture Tripod.

An entirely new design to meet the requirements of those using Reflex Cameras for portraiture, etc. Made in polished Walnut, sliding adjustable legs, and large circular top, very rigid and portable.

PRICES :—No 1, 46 inches high, **50/-.** No. 2, 58 inches high, **63/-.**



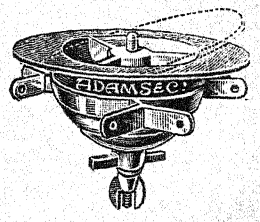
Adams Minex Tripod.

Strongly made three-fold, rule joint, polished Ash with three cross lay mahogany top, extremely rigid.

No. 1 suitable for	½ Plate Minex or ½ Plate Field Cameras	**£3**	**3**	**0**
No. 2 ,,	½ Plate Minex or 1/1 Plate Field Cameras ...	**£4**	**4**	**0**
No. 3 ,,	1/1 Plate to 15 × 12 Field Cameras	**£5**	**5**	**0**

Adams' Ball & Socket Tripod Top

This is beautifully made in Aluminium and Silvered Gun Metal. Revolving and tilting adjustment, whilst camera is fixed on top. Extremely rigid.
Complete with Camera Screw **84/-**



Specially designed for use with three-fold Minex tripods.

The Adams STOP-WATCH EXPOSURE METER

Fitted with new speed Scales for lenses up to F/3.5 and Exposure Speeds up to 1/1000th of a second! The most Practical Exposure Meter ever introduced.

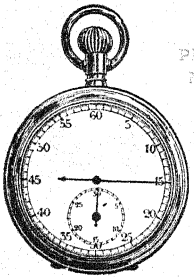


Fig. 1.

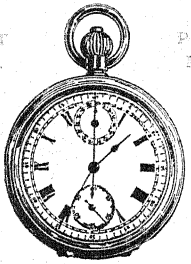


Fig. 2.

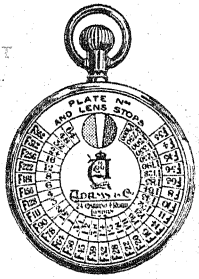


Fig. 3.

Adams & Co. were the first to introduce the STOP-WATCH Exposure Meters.

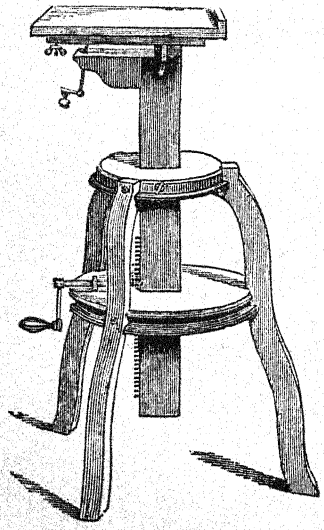
THE THINNEST COMPLETE WATCH METER MADE.

The Adams Exposure Meter is the most accurate and simple method. Is a **first-class Stop-Watch,** with simple Exposure Meter arranged on back. Watch starts at zero and records from one-fifth of second. Useful for exposures of all kinds. Enlarging, Copying, Tank Development.

The Stop-Watch Chronograph is the finest Swiss Chronograph procurable. Jewelled in 17 holes and a most perfect time-keeper.

Stop-Watch complete, **60/-.**

Complete Watch Chronograph (Fig. 2) **140/-.**



THIN WAFER PATTERN.

Beautifully finished, 2 ins. in diameter and $\frac{1}{8}$th of an inch in thickness. The price includes Speed Card and a packet of Exposure Papers. Price **5/6.**

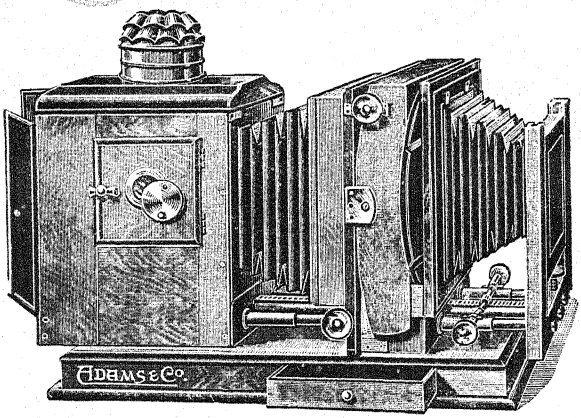
All meters can be had, with either "F" or "U.S." Stop Value Numbers.

Adams Studio Stand

Strongly made of polished mahogany, Archimedean rack rising and falling adjustment, rack tilting top. Best finished throughout, presenting a handsome appearance.

£10 10 0

The Adams Minex Enlarger

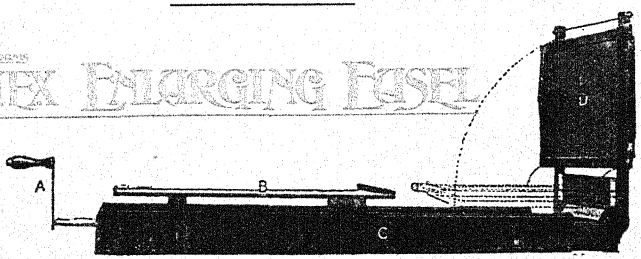


The Adams Minex Enlarger is the result of long experience and combines all requirements of a perfectly practical instrument with our well-known high-class workmanship and material. It is constructed of thoroughly well-seasoned mahogany, polished, brass bound and lined with asbestos and Russian iron. Bellows also lined with asbestos.

Front holding enlarging lens is fitted with our well-known quick and fine adjustment which permits of any size enlargement being readily focussed. Square compound condenser mounted in wooden hinged frame is fitted so that even illumination of the negative is assured. The stage carrying negative is fitted with all movements, quickly and easily adjusted. Carrier revolves for bringing negative from horizontal to vertical positions. The body is so arranged that any illuminant can be used, but wherever possible we recommend electric.

For negatives up to $4\frac{1}{4} \times 3\frac{1}{4}$	£30	0	0	... ...	$6\frac{1}{2} \times 4\frac{3}{4}$ ...	£45	0	0
For negatives up to 5×4 or $5\frac{1}{2} \times 3\frac{1}{2}$ ...	£35	0	0	... ...	$8\frac{1}{2} \times 6\frac{1}{2}$ ...	£60	0	0

The Adams Minex Enlarging Easel

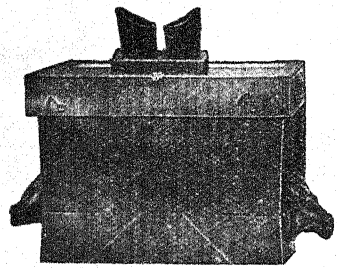


Simple, accurate and practical. Travelling stage is arranged to bring lens of enlarger in alignment with centre of easel. Base is telescopic adjusted by endless screw. Vertical rise and fall. Easel with plate glass front holding paper in position ruled all sizes to 15×12.

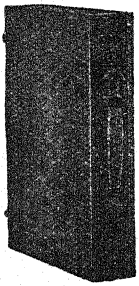
PRICES.

$\frac{1}{2}$-plate and 5×4	£15
$\frac{1}{1}$-plate	£18
$\frac{1}{1}$-plate	£20

The Adams PORTABLE DARK ROOM



Open.



Closed.

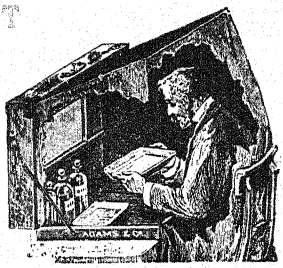
A Changing Tent or Portable Dark Room, very convenient for loading and unloading Dark Slides, etc., and inserting Plates and Films into Developing Tanks, permitting development of Plates and Films in daylight. THE ADAMS PORTABLE DARK ROOM is constructed on practical lines, when open is quite rigid and is self contained, easily erected for use and, when closed, resembles a small Attaché Case. Fitted with large non-actinic window and eye pieces. Has light-tight sleeves through which the hands are inserted and allows ample movement Will be found most useful to travellers.

Approximate Measurements :—

No 1—Closed $2\frac{1}{2} \times 10 \times 13$.	Open $12\frac{1}{2} \times 10 \times 13$	70/-	Postage and Packing, Inland, 2/6
No. 2—Closed $2\frac{1}{2} \times 12\frac{1}{2} \times 18$.	Open $16\frac{1}{2} \times 12\frac{1}{2} \times 18$	80/-	Postage and Packing, Inland, 3/6
No. 3—Closed $3 \times 14 \times 20$.	Open $17 \times 14 \times 20$	100/-	Postage and Packing, Inland, 4/6

Panchromatic safe light windows can also be supplied : No. 1, **7/6** ; No. 2, **10/6** ; and No. 3, **12/6** extra.

ADAMS & Co.'s 'CHALLENGE' DARK TENT



The Tent is a complete Portable Dark Room, being specially designed to stand rough usage and is very strongly constructed of seasoned wood. The corners are iron bound ; a strong handle and lock are supplied. Ample room for developing all size plates up to $8\frac{1}{2} \times 6\frac{1}{2}$; fitted with sliding windows giving ruby, orange or white light, and thoroughly ventilated, permitting development in perfect comfort. Indispensable for travellers abroad where it is difficult to obtain use of dark room.

Measures when closed $24 \times 17 \times 5$, price £8 10 0.
Large Size for plates up to 15×12, price £12 10 0.
(Measuring when closed $32 \times 20 \times 6$).

Window for panchromatic plates can be supplied **7/6** extra.

The ADAMS POCKET CHANGING BAG

Strongly made. Light tight. Invaluable for changing plates, **21/-.**

NEW DIRECT VISION FINDER

Specially constructed with spring clip for use with all makes of Roll Film and Folding Cameras, price **21/-.**

Adams & Co.'s VIEW METER

The meter can be scaled to give exact view obtainable by any number of lenses, thus enabling the operator to determine the most suitable lens to use for desired picture, price **32/6.**

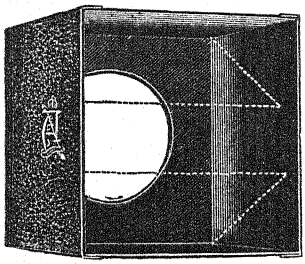
"Helgar" Isochromatic Screens, Light Filters, and Colour Screens.

These Screens and Filters are cemented between thin Optical French Plate Glass, carefully tested and accurately corrected for colour values for the plates for which they are intended to be used. They are mounted also between optically-worked **HELGAR** Flats. These latter are specially recommended for all large aperture and Telephoto Lenses, and are fitted to the lens by means of perfectly adjusted Brass Mount, either to screw in or push on the lens.

	Diameter, 1-in.	1½-in.	2-in.	2½-in.	3-in.	3½-in.
Best Iso Screens and Filters in special fittings, 3 densities, ×3, ×5, ×10 ...	17/-	20/-	22/6	25/-	37/6	45/-
Do. in Helgar Optical Flats	45/-	50/-	65/-	87/-	120/-	190/-
Autochrome Agfa Colour Screens ...	18/6	20/-	22/-	24/-	31/-	35/-

Wellington, Ilford, Imperial and Kodak Screens at above prices.

Dallmeyer Lens Hood



Designed, Registered and Introduced in 1910



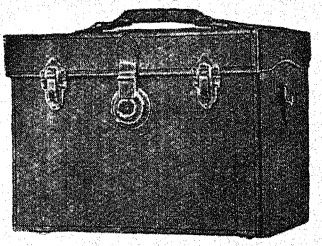
Improved Model. The smallest, neatest and most practical lens hood on the market. Filters self-contained and easily removed.

Prices complete with Wratten, Ilford, Imperial or Agfa filters.
Up to 2 in., **28/6** ; 2½ in., **37/6** ; 3 in., **45/-.**

Ordinary Model without filters.
Up to 2 in., **21/-** ; 2½ in., **25/-** ; 3 in., **27/6**; Larger, from **30/-**

When ordering give exact diameter of lens mount and filters required.

Sanders Camera Cases



No. 1. Best quality canvas, thoroughly waterproof, and adjustable web sling strap.
No. 2. Best Black morocco, stiffened, lined velvet, and sling strap.
No. 3. Best quality, solid hide, black or buff, lined velvet, lock and key, and detachable adjustable best web strap.
No. 4. Similar to Style 3, but made in best selected pigskin.
No. 5. Air-tight enamelled steel, felt lined. Handle and lock.

				Style 1.	Style 2.	Style 3.	Stvle 4.	Style 5.
Model A,	3¼ × 2½-pl., taking Camera and 3 Slides			33/-	70/-	80/-	105/-	95/-
Minex,	¼-pl.,	do.	do.	35/6	75/-	85/-	115/-	100/-
,,	⅝-pl.,	do.	do.	38/6	80/-	90/-	123/-	110/-
,,	½-pl., or 10 × 15	do.	do.	45/-	100/-	115/-	140/-	125/-
Folding Minex,	3¼ × 2½-pl., Camera & Film Pack Adapter			30/-	70/-	80/-	105/-	90/-
,,	¼-pl.,	do.	do.	35/-	75/-	85/-	115/-	95/-
,,	⅝-pl.,	do.	do.	38/-	80/-	90/-	120/-	100/-
,,	½-pl., or 10 × 15	do.	do.	44/-	90/-	105/-	135/-	115/-
Vesta,	3¼ × 2½-pl., Camera, Screen, Film Adapter			15/6	37/-	45/-	67/-	60/-
Verto,	¼-pl.,	do.	do.	17/-	40/-	50/-	70/-	65/-
Idento,	⅝ & 5½ × 3½-pl.,	do.	do.	18/6	45/-	55/-	75/-	75/-

SECOND-HAND DEPARTMENT

We carry at all times a very extensive stock of High-class Second-hand Cameras and Lenses of every description, and are prepared to take in part payment or purchase for cash any apparatus submitted to us for valuation.

All apparatus is carefully examined, overhauled, repaired, and put in good working order AT OUR OWN WORKS before being sent out, and thus can be purchased with confidence.

List of Second-hand Apparatus on application.

DEVELOPING, PRINTING AND ENLARGING

We specialise in doing only the best work at competitive prices, all orders entrusted to us are treated individually, therefore best possible results only obtained. LIST OF PRICES on application, and Quotations given for special work.

Cameras Constructed and Experimental Work carried out to specification.

MOTION PICTURE APPARATUS

We carry a full stock of the leading makes of Cinè Cameras and Projectors, and can supply any model required.

Special Note to Customers ordering from abroad.

Full remittance may accompany order, or goods can be sent C.O.D.

We are willing to procure and enclose any goods other than our own manufacture for the convenience of customers.

EXTENDED TERMS

Having had many requests from customers wishing to purchase on extended payment terms, and as this system has become so general and adopted by the leading firms, we have decided to supply any apparatus on the deferred payment system.

Correspondance en Français si on le désire.

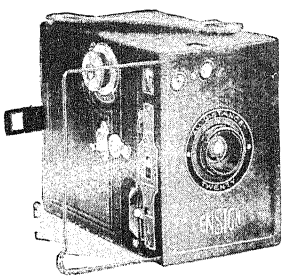


ENSIGN

CAMERAS

ENSIGN

ENSIGN ALL-DISTANCE "TWENTY"



This is one of the series of "All-Distance" Cameras, of which there are available a de luxe model at 25/- and two folding models at 35/- and 42/-

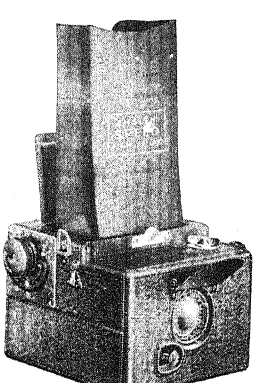
Revolutionary in value, equipment and achievement. Takes pin point sharp photos from 3 feet and upwards by the Patent (No. 271186) All-Distance Optical System, eliminating focussing.

Fitted with unique "one-way" shutter movement for Time and Instantaneous exposures, two stops, silent winder, simple loading device, two reflex and one full size disappearing direct vision view finders. For $2\frac{1}{4} \times 3\frac{1}{4}$ films of any make.

Metal throughout, with body partially covered in fine grained leather cloth and front of "silk" crystalline finish.

13/6

ENSIGN SPEED FILM REFLEX



For $2\frac{1}{4} \times 3\frac{1}{4}$ (6 × 9 cm.) roll films.

Roll Film Photography with a focal plane reflex Camera—the ideal at last achieved with this splendid Camera. Light and handy in shape, "one-turn" knob for shutter setting, deep and quick erecting focussing hood.

Perfect flatness of the film is ensured by the Ensign patent film registering device.

Made of mahogany with fine grain leather covering. Fitted with guaranteed Aldis Uno $f/4{\cdot}5$ anastigmat and fast focal plane shutter with range of speeds (1/25 to 1/500 second) and Time.

£8 8 0

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Ensign, Ltd., High Holborn, London, W.C.1, and at Glasgow, Manchester, Leeds, N

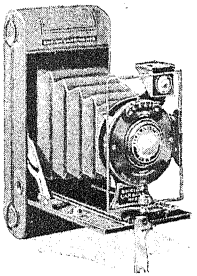
ENSIGN CAMERAS—

ENSIGN CARBINE No. 3

Meets the World's competition.

With the All-British Ensar *f*/6·3 Anastigmat, the three speed Trichro Shutter (1/25, 1/50, 1/100 second), and the Ensign patent film registering device (Patent 281,802), pin point exposure is assured.

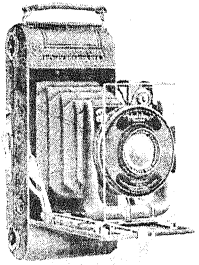
Body of metal throughout, leather covered, leather bellows, fine black enamel and nickel finish. For 2¼×3¼ roll films.



£3

ENSIGN CARBINE No. 5

A popular model beautifully made, with patent film registering device that keeps the film absolutely flat during exposure (Patent 281,802), simple loading, direct vision finder with sighter plate for eye-level pictures, also brilliant reversible finder, silent winder. Fitted with Aldis Uno *f*/4·5 Anastigmat, high speed Mulchro shutter with speeds of 1, ½, 1/5, 1/10, 1/25, 1/50, 1/100 second, Time and Bulb. All brass body, real leather bellows, real leather covered, sturdy "U" front. For 2¼×3¼ roll films.



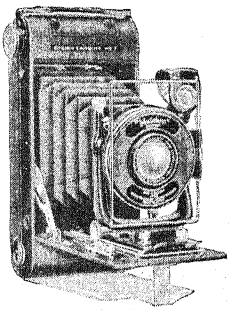
£5 5 0

ENSIGN CARBINE No. 7

A de luxe development in camera construction, embodying such ingenious features as film registering device controlled from film sight hole, hinged back, quick action radial focussing, lever rising front, screw cross front, direct vision and brilliant view finders—all features that make the outfit suitable for the most serious or simple work without cumbersome appurtenances.

Made of brass throughout, with black enamel and nickel fittings, grained leather covering.

British made Mulchro shutter (speeds 1 to 1/100 second, Time and Bulb) and guaranteed Aldis Uno anastigmat *f*/4·5.



£6 10 0

CATALOGUE OF ENSIGN CAMERAS

tingham, Swansea, Exeter, Southampton, Birmingham, Ipswich, Calcutta & Bombay

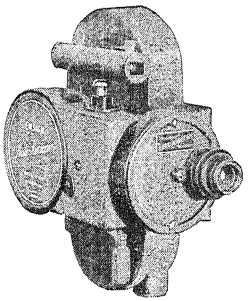
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ENSIGN THE WORLD'S FINEST VALUE in 16mm. CAMERAS and PROJECTORS

AUTO-KINECAM

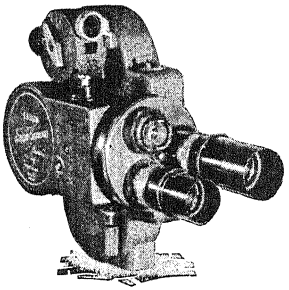
So simple to operate, as to make the taking of Movie Pictures as easy as snapshotting. Comfortably shaped die cast case—working parts accurately machined, double spring motor taking 35 feet at one wind, normal, half speed and slow motion speeds, enclosed direct vision finder, Cinar *f*/2·6 anastigmat, complete in leather case. The world's finest value and the only All British 16 mm. Cinema Camera.



£18 18 0

SUPER-KINECAM

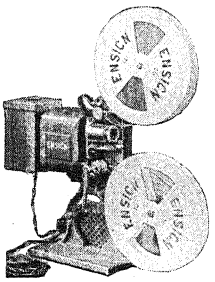
Has many refinements. A triple lens turret head, quickly brings into action each lens, tri-optic synchronising view finder to match each lens gives full size view, prismatic adjustment for "close ups," multi-speed shutter for 8, 12, 16, 32, 64 pictures per second. Chromium plated and crystalline enamel finish—with Cinar *f*/2·6 Anastigmat 1 in. focus—complete in leather case with accommodation for spools and accessories.



£45

SILENT SIXTEEN "50" PROJECTOR

A perfect precision Projector for 16 mm. film, with mechanism designed on real engineering principles—die cast body and turned gears and sprockets. Takes 400 ft. spools. Operates from house supply on any voltage from 100 to 250. Projects a brilliant, steady picture up to 3 to 4 feet in size. Simple to use and load. Complete with special 8 amp. lamp, resistance, leads, and one each 400 ft. and 100 ft. spools.



£6 15 0

With motor drive, £11 12 6

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ALL BRITISH MANUFACTURE

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SUPER PRESS	1500
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ULTRA RAPID	700
STUDIO	400, 500 and 650
***SUPER-SPEED-ORTHO**	550
STUDIO-ORTHO	400
***SPECIAL RAPID PAN** (Panchromatic)	400
***SELF-SCREEN ORTHO**	300
SPECIAL RAPID (Red Label)	275
***ORDINARY.** For copying, etc.	100
PAN PROCESS (Rapid Panchromatic)	100
PROCESS. Fine Grain	75
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LANTERN. Cold or Warm Tone	
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***X-RAY.** Extremely Rapid	
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***SUPER-SPEED PORTRAIT FILM**	700
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X-RAY (Double Coated)	Extremely Rapid
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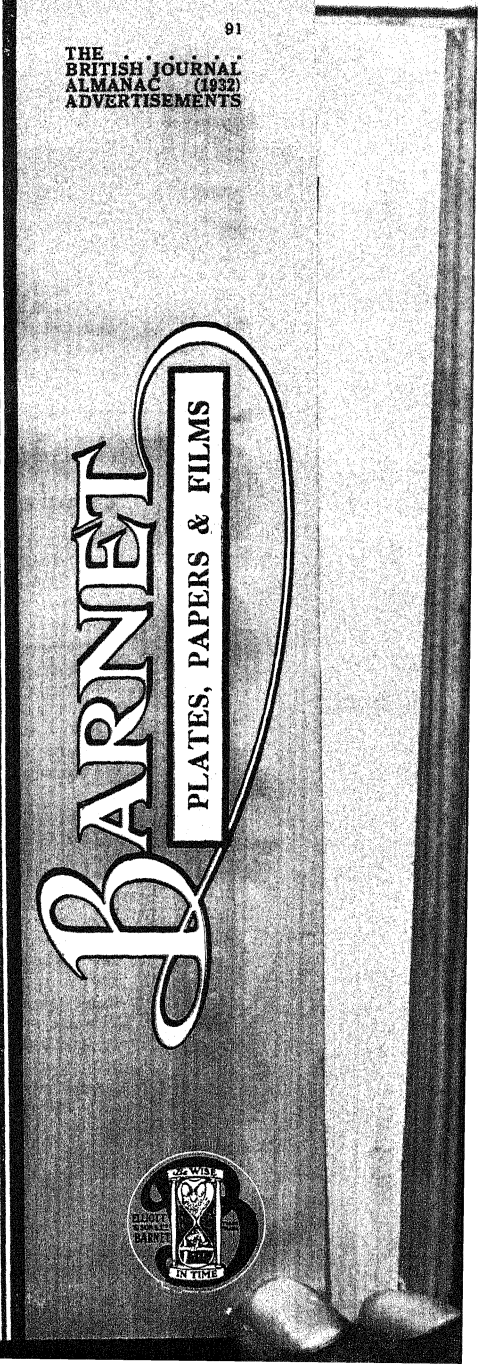
*Also made in Matt-Emulsion

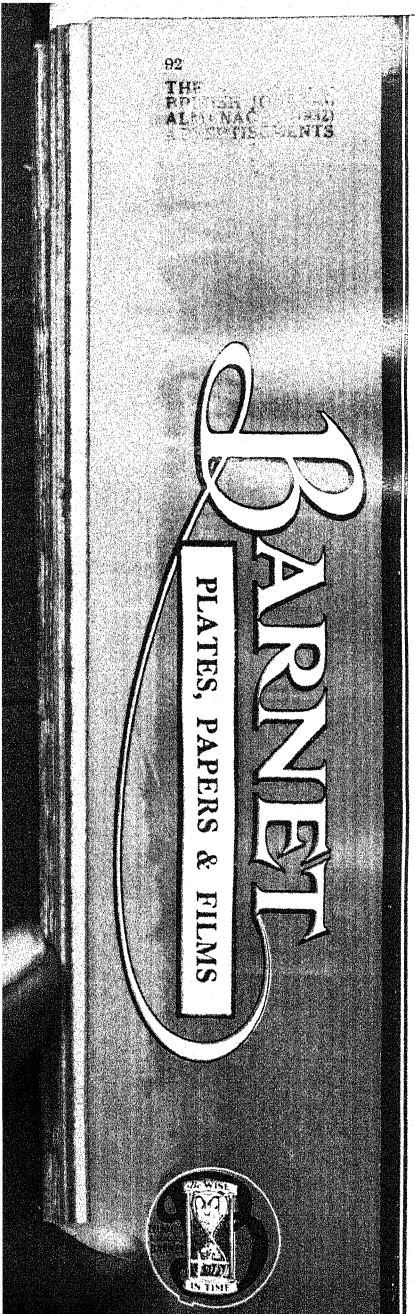
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	Surface
ENAMEL (Glossy)	
Single and Double Weight.. *Vigorous, Normal and Soft*	Enamel (Glossy).
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MATT	
Single and Double Weight.. *Vigorous and Normal* ..	Matt.
PLATINO-MATT	
Single and Double Weight.. *Normal*	Rough.
Single and Double Weight .. *Normal and Vigorous* ..	Smooth.
ORDINARY	
Single and Double Weight.. *Normal*	Rough and Smooth.
Single and Double Weight.. *Vigorous*	Smooth.
CREAM CRAYON	
Double Weight .. *Vigorous and Normal*	Platino-Matt: Smooth. Natural Surface: Smooth.
Double Weight .. *Normal*	Semi-Matt. Platino-Matt: Rough. Natural Surface: Rough. Natural Surface: Medium Rough.
TIGER TONGUE	
White and Cream .. .. Double Weight *Normal* ..	Extra Rough.
VELBRO	
Single Weight *Normal* ..	Velvet (Pebble Grain).
ILLUSTRO (for Press Work)	
Single and Double Weight.. *Extra Contrasty, Contrasty, Normal and Soft*	Glossy, Semi-Matt and Matt.
LINEN GRAIN	
White and Cream *Normal* ..	Semi-Matt.

POST CARDS in all Grades.

Prices on Application.

ELLIOTT & SONS LTD., BARNET, ENGLAND

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Plates, Papers and Films

ALL BRITISH MANUFACTURE

Bar-Gas

BARNET GASLIGHT PAPER

MEDIUM ..	For Average Negatives	In Art, Glossy and Matt.
VIGOROUS ..	For Thin Negatives	
SOFT	For Hard Negatives	

Single Weight and Card all Surfaces.

A Gaslight Paper of great charm, clean working and reliable. Made in three grades to suit negatives of any character, whether thin or hard in quality.

An ideal paper for Snapshot prints and highly recommended for

D. & P. WORK.

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(BARNET CHLORO-BROMIDE)

For Mezzo-Brown tones by development only.

Verona is made in two series—"Standard" for Contact Prints and "Rapid" for Enlargements.

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Cream Smooth Natural	Double Weight.
Cream Rough Natural	Double Weight
Cream Smooth Matt..	Double Weight.
Cream Semi-Matt ..	Single and Double Weight.
White Matt	Double Weight.
White Semi-Matt ..	Single and Double Weight.
White Silk-Lustre	Double Weight.
Cream Silk-Lustre	Double Weight.

VERONA "RAPID"

Cream Smooth Natural	Double Weight
Cream Rough Natural	Double Weight.
Cream Smooth Matt..	Double Weight.
White Matt	Double Weight.

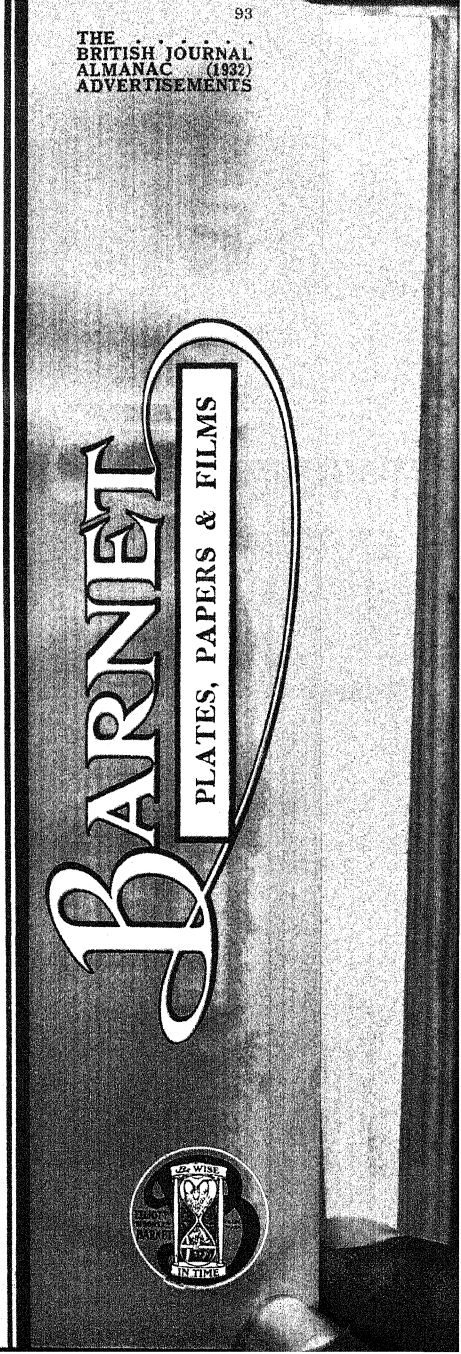
VERONA "PLATINO-SPECIAL"

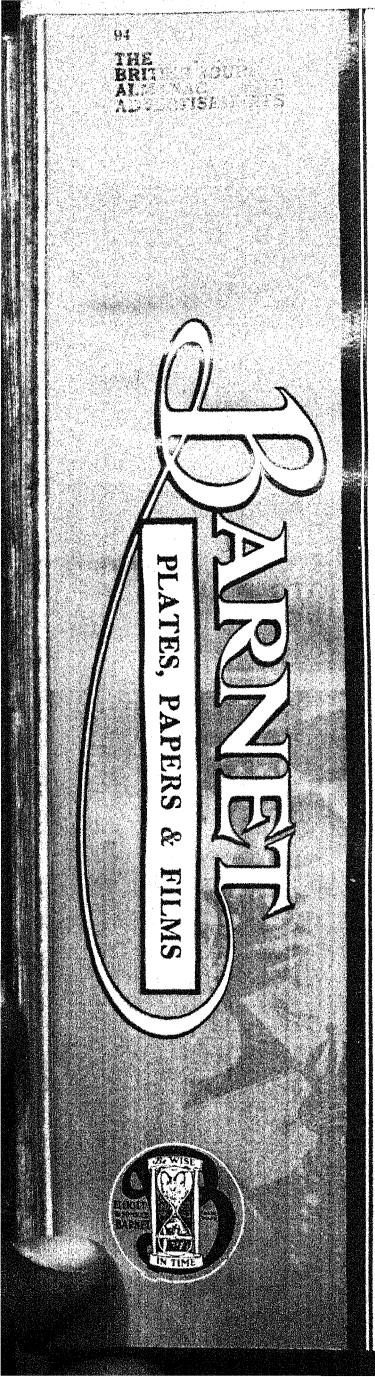
Creamy White	Double Weight.

For Contact Prints and Enlargements.

Prices on Application.

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Bromoil

Specially made for the Bromoil Process.

CREAM CRAYON ..	.. Natural Surface. Rough and Smooth.
ORDINARY WHITE	.. Rough and Smooth.
TIGER TONGUE ..	.. Cream and White. Extra Rough.

Bar-Tona

BARNET COLLODION SELF-TONING PAPER.

"Bar-Tona" is a high-class self-toning printing paper, very simple to use, and artistic in the finished result "Bar-Tona" is an ideal paper for making small prints from snapshot negatives, giving a charming range of tone from warm sepia to cool grey. Made in Glossy and Matt. Single and Double Weight.

BARNET P.O.P.

A printing-out Paper of acknowledged excellence.

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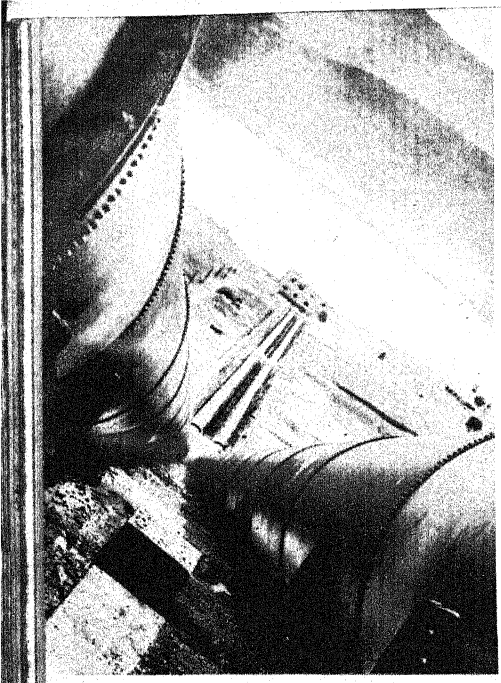
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MIDDLESBROUGH





BLOCKS

HOODS produce every kind of process blocks; Hood *line blocks* are wonderfully sharply defined, deeply etched, and despatched usually by return of post. For all HOOD blocks you may rely on QUICK DELIVERY.

Tone Blocks :— AUTOBLOCKS are immensely popular in view of their extraordinary cheapness. AUTOBLOCKS are a real economy achievement; they fill a real need where ordinary hand-etched blocks might be too expensive. We have numbers of regular customers using great quantities of AUTOBLOCKS when otherwise no blocks at all could have been afforded.

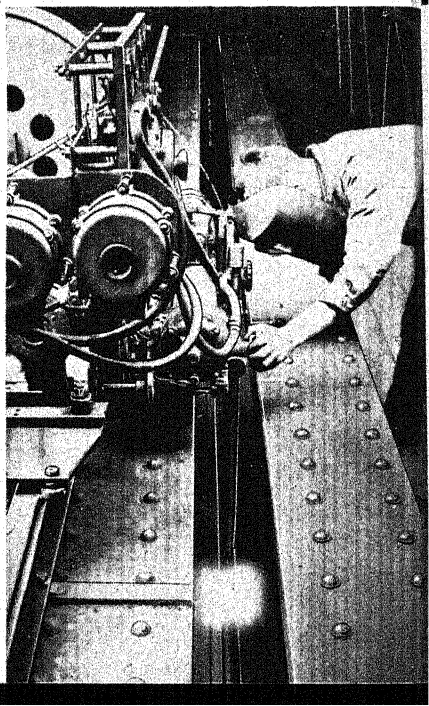
HOOD craftsmen know just how to get the very best out of a photograph; if we find the least wrong with any standard block it is scrapped, and a fresh one made.

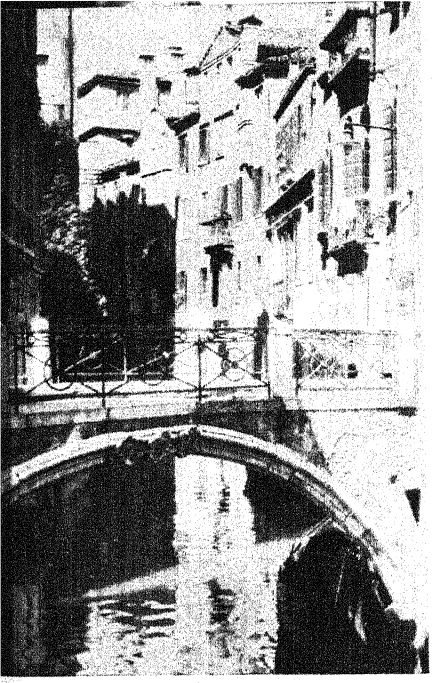
In addition to Block services, all the usual preparation of subjects can be carried out: Retouching, working up, designing, type setting, lettering, artists work, draughtsmanship or the making of line drawings from photographs.

HOOD prices in themselves are low; in addition Hoods offer exceptionally generous terms to the TRADE ONLY. Carriage is PAID. Big contracts invited at still further reduced terms.

HOODS, Engravers

SANBRIDE WORKS, **Middlesbrough**





GRAVURE

Gives exquisite quality of illustration at minimum expense, and does not need costly coated art paper.

HOOD Photogravure for booklets, folders, catalogues, book insets and all commercial advertising matter.

You MUST consider Photogravure some day soon —why not use it now instead of old, commonplace processes?

THIS advertisement is produced by HOOD Photogravure process.

LETTERHEADS:

HOODS can now quote for Letter-Headings with the new STILTSBLOCKS—printed effectively, on ordinary good writing paper. Send for specimens —this is something *new!*

If you haven't a copy of our latest lists, please ask for them—we have a new block list; and we supply screen chart (free) which shows each screen ruling on its appropriate paper. Ask also for block order forms. See last year's B.J. Almanac, pp. 107–110, for some specimens of our BLOCKS.

HOODS, Designers

SANBRIDE PRESS, **Middlesbrough**





1000 POSTCARDS

at less than a farthing eac
—beautifully produced.

(Our price 18/6 for 1000 cards from customers block) We also have a special rate for despatching postcards same day as photo received.

This is a *GUARANTEED DESPATCH* if photo copy received at our works by first post a.m.

Complete price list and sample gratis on application. Large batch 6d. please. We produce postcards by several halftone processes and by photogravure.

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HOODS produce all BLOCKS including:

COLOUR BLOCKS
2, 3 or 4 colour, from Coloured Objects, Pictures, Autochromes, or from uncoloured Photographs.

DE LUXE TONE BLOCKS
The best that money can buy.

AUTOBLOCKS
Cheap commercial competitive blocks for competitive trades.

NEWSBLOCKS
Very rapid, reliable despatch.

STILTSBLOCKS
Deeply electric-etched, will print on almost any kind of paper.

LINE BLOCKS
Reproducing line drawings.
If desired in 2 or more colours.

NAME & DOOR PLATES

HOODS, Gravurers

SANBRIDE PRESS, Middlesbrough



PHOTO OF PUPPIES BY COURTESY MR. THOS. FALL

The Adhesive Dry Mounting Co., Ltd.

THE

Adhesive Dry Mounting Co.

LIMITED

THE

Pioneers of Dry Mounting.

Important Notice.

When ordering Tissue, see that you Specify for

"ADEMCO TISSUE"

THE ORIGINAL AND BEST

Every sheet bears the Watermark "ADEMCO," also the packet should bear our own label.

Ask for

"ADEMCO"

TISSUE,

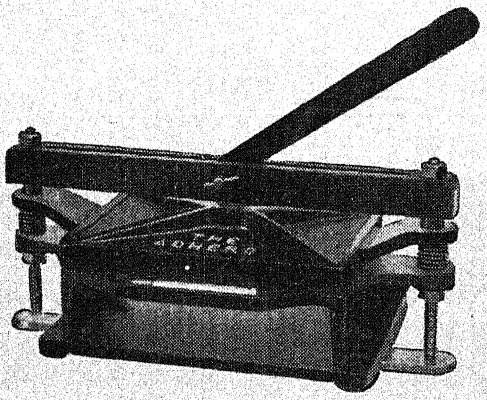
27 & 28, Fetter Lane, London, E.C.4.

The Adhesive Dry Mounting Co., Ltd.

Telegrams—"Accroitre, London," Code A.B.C.

The ADHESIVE DRY MOUNTING CO., Ltd., 27 & 28, Fetter Lane, London, E.C.4.

ORIGINATORS OF THE DRY MOUNTING PROCESS



"THE ADHERO"

The only machine for amateurs at the price giving even pressure over the whole of the surface of the print at one and the same time.

Those acquainted with the extreme value which may be attached to the Dry Mounting method candidly admit that this apparatus brings the amateur in line with the professional as regards mounting.

The Dry Mounting method is most simple and effective.

The "ADHERO" machine will mount a ¼-plate, 5 by 4, or a ½-plate print on a mount up to 10 inches wide in one pressure. Whole plate prints on 10 by 15 mounts in two pressures. Size of heated plate 7½ by 5½, width between arms 10¼ inches.

PRICES.

OUTFIT No. 1, for Gas heating, 55s. 0d. complete
,, ,, 2, ,, Spirit ,, 60s. 0d. ,,
,, ,, 3, ,, Electricity, 75s. 0d. ,,

Each Outfit includes all Accessories and One Packet of Adhesive Tissue Border Tints, and Mounts.

27 & 28, Fetter Lane, London, E.C.4.

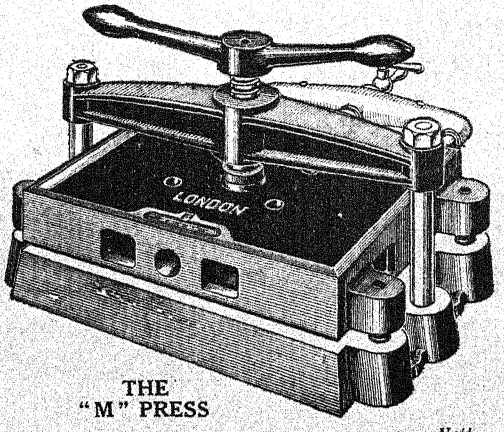
The Adhesive Dry Mounting Co., Ltd.

DRY MOUNTING MACHINE

THE "M" PRESS

A Dry Mounter for Amateurs and Professionals

This machine is suitable for amateur and professional photographers who go in for larger work than half-plate. It is the best value at the price.



THE "M" PRESS

PRICE.	*Nett.* £ s. d.
Heated by Gas	6 10 0
Heated by Electricity	10 10 0

Size of Heated Plate, 12 by 8 in. Width between the Arms, 13¾ in.

Will mount prints up to 12 by 8 in. on a mount 13¾ by 10 in. in one pressure or a 12 by 15 print on a mount 13¾ by 18 in. in two pressures.

ACCESSORIES FOR "M" MACHINE.

	s. d.
Mounting Covers, size 12½ by 9½ in.	
No. 1, Glazed Surface, Zinc ... ... each	3 6
No. 2, Matt ... ... „	3 6
Fixing Iron in Wood Handle ... ... „	2 6
Spirit Lamp for Heating Fixing Iron ... ... „	4 6
Gas Burner for ditto ... ... „	7 6
Extra Thermometer for Gas Machines ... ... „	3 6
„ „ „ Electric Machines ... ... „	5 0

Write for illustrated Catalogue post free.
For prices of Adhesive Tissue see page 103.

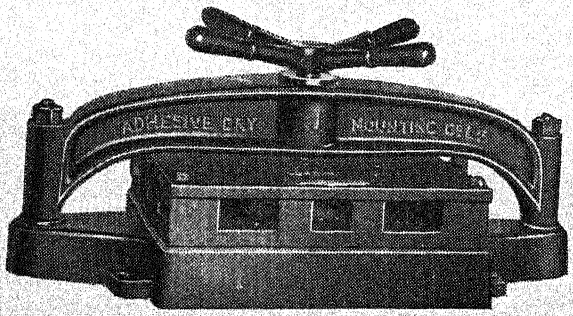
27 & 28, Fetter Lane, London, E.C.4.

The Adhesive Dry Mounting Co., Ltd.

The IMPROVED MODEL DRY MOUNTER

"J" PRESS

Designed to meet the requirements of every Professional Photographer.



This new model Dry Mounter has a platen of 15½ in. by 12½ in., width between the arms 24½ in., allowing of a mount to be inserted 24½ in. full; a most convenient size for mounting 15 in. by 12 in. prints. Can be heated by gas or electricity. When ordering for electricity please **state voltage.**

PRICES.	*Nett.* £ s. d.
Heated by Gas	11 10 0
,, ,, Electricity	16 0 0

TYPE "U" PRESS exactly similar in working, constructed with a larger platen for mounting up to 20 in. by 16 in. prints.

	£ s. d.
Size of Heated Plate, 20 in. by 16 in. Heated by Gas	20 0 0
Width between Arms, 21 in. ... ,, ,, Electricity ...	28 0 0

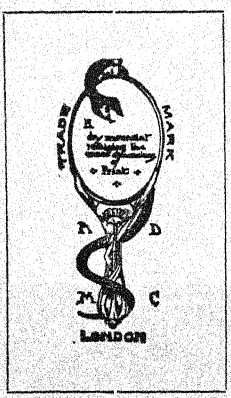
Write for Illustrated Catalogue, containing prices of Accessories for "J" and "U" Presses post free.

For prices of Ademco Tissue see page 103.

27 & 28, Fetter Lane, London, E.C.4.

The Adhesive Dry Mounting Co., Ltd.

"ADEMCO" ADHESIVE DRY MOUNTING TISSUE



See that every sheet bears this Trade Mark.

THE ORIGINAL AND THE BEST

EFFICIENCY AND HIGH GRADE OF MANUFACTURE GUARANTEED.

Absolutely Reliable. Perfect Adhesion and permanency after the lapse of any length of time.

Used by the leading photographers the world over.

FOR TROPICAL COUNTRIES.

We supply Tissue interleaved with special material for Tropical Countries; this greatly reduces the risk of damage during transit.

PRICES.

Size.	9d. Pkts.	1s. 3d. Pkts.	One Gross Boxes. s. d.
3½ by 2½	80 pieces	—	1 6
3½ „ 3½	60 „	—	1 9
4½ „ 3½	54 „	—	2 0
5 „ 4	40 „	—	2 8
5½ „ 3½	36 „	—	2 8
6 „ 4½	—	48 pieces	3 0
4½ „ 4½	—	48 „	3 0
6½ „ 3½	—	48 „	3 0
6 „ 4½	—	44 „	3 3
6½ „ 4½	—	40 „	3 10
8 „ 6	—	—	6 0
8½ „ 6½	—	22 „	7 2
		2s. Pkts.	
10 „ 8	—	26 pieces	9 9
12 „ 10	—	18 „	14 3
15 „ 12	—	12 „	21 9
20 „ 16	—	—	37 9
20 „ 24	—	—	54 0
20 „ 24	—	— per quire	9 0
20 „ 24	—	— per ½-quire	4 9
Rolls, 30 ft. by 30 inches		— per roll	9 0

Sample Packet post free on application.

27 & 28, Fetter Lane, London, E.C.4.

The Adhesive Dry Mounting Co., Ltd.

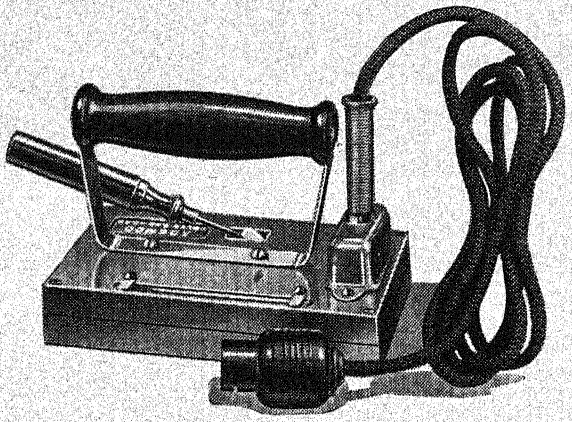
NEW ELECTRIC APPARATUS FOR DRY MOUNTING

The "ADEMCO" Electric Mounting Iron

Is made rectangular in shape in order to obtain an even pressure over the entire surface of the print.

The heating element is a new and patent product which uses very little current and retains the heat for a long time after being disconnected.

The iron can be adapted for any voltage from 100—240, and is therefore practically free from any risk of fusing. It can also be used for domestic purposes.



PRICE, complete with Thermometer, Fixing Iron, Metal Plate, Mounting Tissue, Mounts and Tints, packed in a convenient wooden box, together with 5 feet of flex.

WHEN ORDERING PLEASE STATE VOLTAGE.

COMPLETE 35/-

27 & 28, Fetter Lane, London, E.C.4.

The Adhesive Dry Mounting Co., Ltd.

MERRETT'S PATENT AUTOMATIC VISIBLE TRIMMER

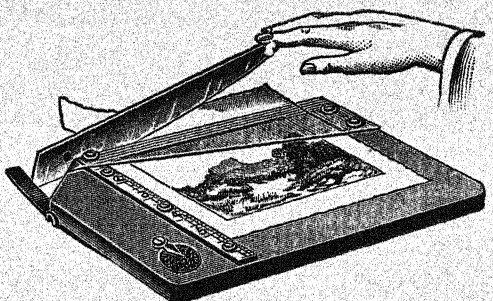


Patent 123967

The most efficient and practical Print Trimmer on the Market. Will rim Prints equally well wet or dry.

PRICES.

	s.	d.		s.	d.
8½ in. cut (21 cm.)	12	6	15½ in. cut (41 cm.)	55	0
10 „ „ (25 cm.)	25	0	24 „ „ (60 cm.)	90	0
12½ „ „ (31 cm.)	35	0	Larger sizes up to 42 in.		



THE "TRIMMERRETT."

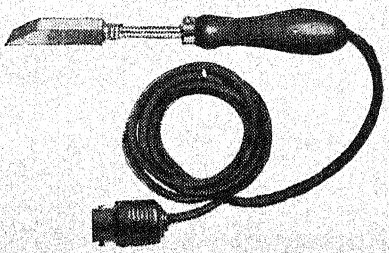
7 in. cut (18 cm.) ... ... 10s. 0d. 10¼ in. cut (26 cm.) ... £1 0 0

Trims absolutely square. Every part of print in full view.
Especially designed for Amateur Photographers.

27 & 28, Fetter Lane, London, E.C.4.

The Adhesive Dry Mounting Co., Ltd.

THE NEW ELECTRIC DRY MOUNTING FIXING IRON.



Every Photographer using an Electric Dry Mounter will find this iron a great advantage over the old method of heating the fixing iron by gas or spirit. The consumption of current is exceedingly small, and is adapted for use on any voltage from 200-250. Other voltages can be adapted to order.

Please state voltage when ordering.

Price complete with 5 feet of flex, 12/6 nett.

"ADHERO" CAMBRIC AND MATT BORDER TINTS.

These papers are coated on the back with our Dry Adhesive, so that it is only necessary to trim to the desired dimensions. They make a very unique and effective finish to any mount.

Sample free on application.

FLEXIBLE MOUNTS

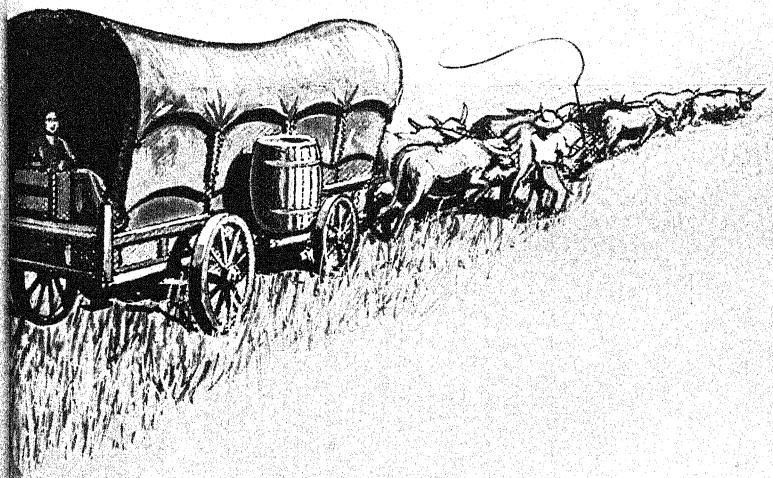
ADHERO SERIES. **ANTIQUARIAN SERIES.**

Specially adapted for Dry Mounting.

Sample Book free on application.

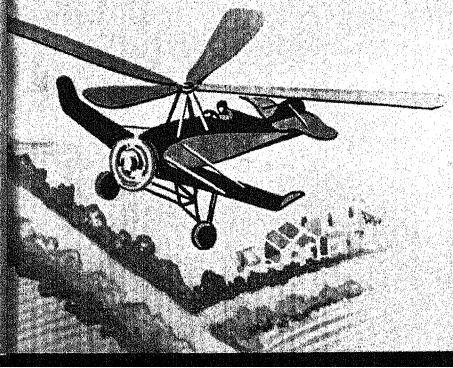
Customers' own prints mounted in our own showroom at reasonable prices, or special quotations given for quantities.

27 & 28, Fetter Lane, London, E.C.4.





Pioneers



ILFORD LIMITED,
ILFORD, LONDON
ENGLAND.

Pioneers

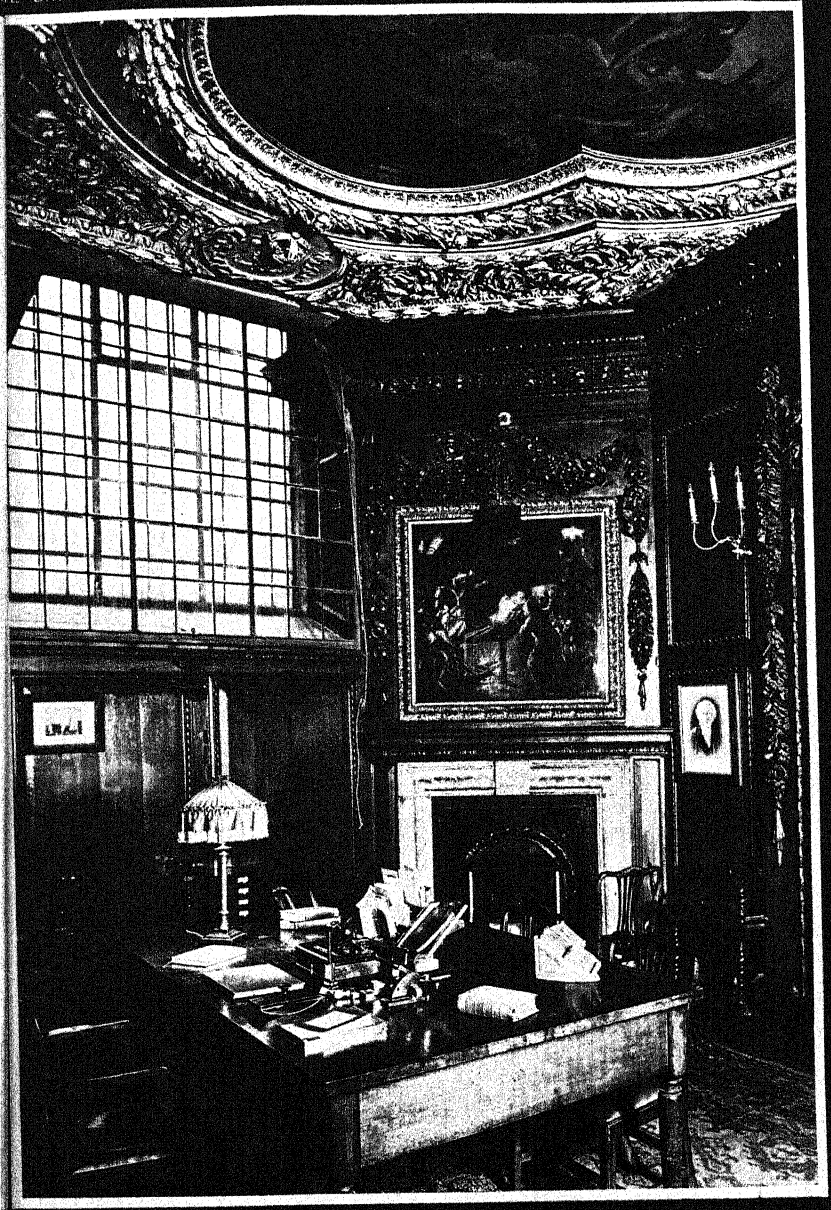
There never have been better photographic materials than those produced by ILFORD. For over half a century this world-famous British firm has been in the van of progress, always inventing, constantly improving, until to-day, there are no materials for photographic purposes so wholly satisfying in their consistent efficiency as

ILFORD

Rely upon them for Success!



ILFORD LIMITED, ILFORD, LONDON



PHOTOGRAPH BY H. BEDFORD LEMERE, F.R.P.S.

NEGATIVE ON ILFORD PANCHROMATIC PLATE

ILFORD
PLATES & FILMS

For Professional Photography

Rigorous maintenance for over 50 years of an unapproachable standard of quality has gained for Ilford materials the confidence of photographers all over the world. They know that to use Ilford Plates, Papers and Films is to ally to their photographic skill the finest support it is possible to obtain. Uniform consistency of maximum quality characterises all Ilford products. A brief selection of professional plates and films is given below:

PLATES

Golden Iso-Zenith	Speed	1400 H & D
Iso-Zenith	„	700 H & D
Zenith (Super sensitive) ..	„	650 H & D
Zenith (Extra „) ..	„	400 H & D
Panchromatic (Soft Gradation)	„	700 H & D to daylight
„ „ „	„	2000 H & D to Half-Watt Light
Panchromatic (Special Rapid)	„	400 H & D

FILMS

Iso-Zenith	Speed	700 H & D
Studio (Super sensitive) ..	„	550 H & D
Universal Ortho	„	350 H & D
Universal	„	350 H & D

ILFORD LIMITED, ILFORD, LONDON



PHOTOGRAPH BY DOROTHY WILDING.

NEGATIVE on ILFORD ISO-ZENITH PLATE

ILFORD
PLATES & FILMS
For Amateur Photography

Amateur photographers appreciate the advantages conferred by the use of Ilford Plates, Papers and Films. The Auto-Filter Plate, the amateur plate par excellence, has probably more adherents than any other plate of its type. It is fast, 400 H & D, highly orthochromatic, and is thoroughly dependable. The following is a selection of Ilford Plates and Films manufactured specially for the amateur photographer.

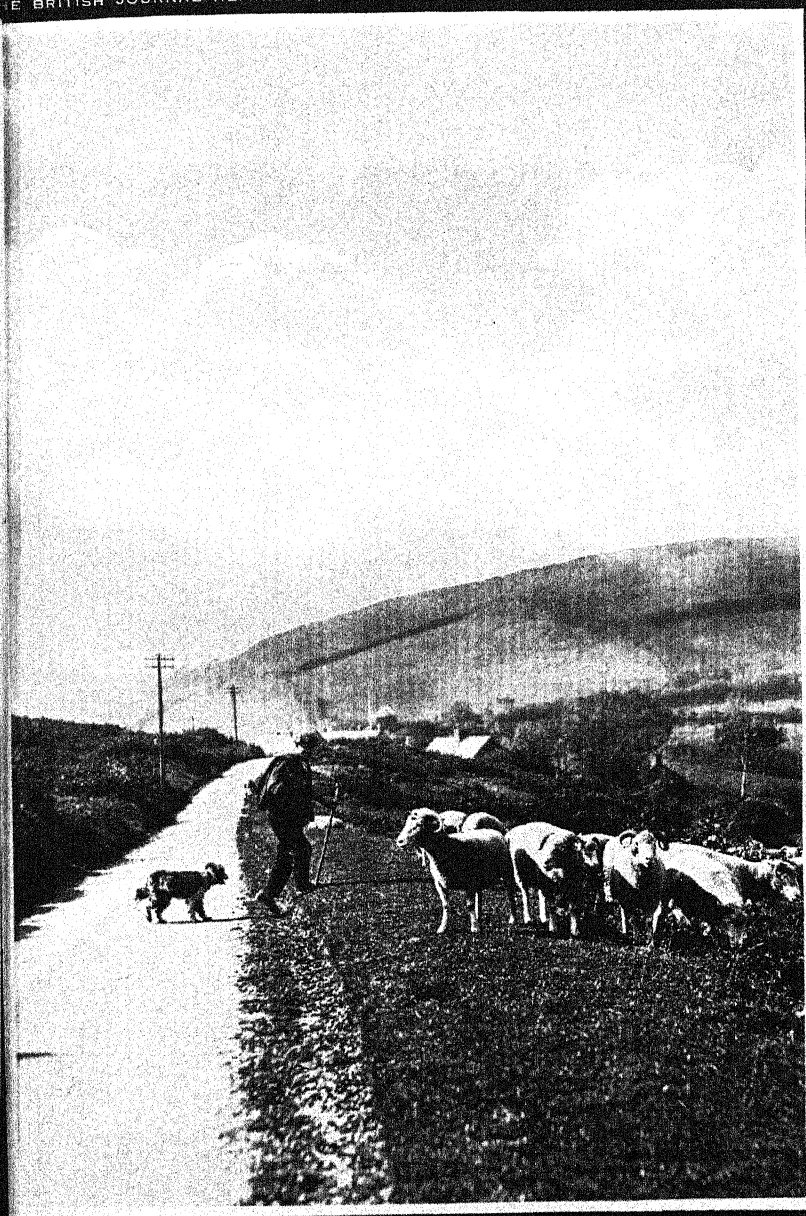
PLATES

Auto-Filter	Speed	400 H & D
Rapid Chromatic	„	400 H & D
Screened Chromatic	„	270 H & D
Special Rapid	„	270 H & D
Panchromatic (Special Rapid)	„	400 H & D

FILMS

Universal Ortho	Speed	350 H & D
Universal	„	350 H & D
Panchromatic Roll Film ..	„	400 H & D

ILFORD LIMITED, ILFORD, LONDON



NEGATIVE on ILFORD AUTO-FILTER PLATE

ILFORD
BROMIDE

In reviewing the new series of Ilford Bromide Papers, the British Journal of Photography described the issue as "an event of more than ordinary importance." That this is so is without doubt, as every requirement of the photographer is now amply provided for. There is a very wide range of beautiful surfaces, and some of the grades are made in 5 degrees of contrast. There are ten grades in single weight and twenty-two in double weight, on white and cream bases. A complete list will be forwarded post free on application. The following is a brief selection :—

SINGLE WEIGHT

Glossy	in 5 degrees of contrast
Special Smooth	„ 3 „ „ „
Natural Grain Matt ..	„ 3 „ „ „
Velvet	„ 3 „ „ „

DOUBLE WEIGHT

Glossy	in 5 degrees of contrast
Special Smooth	„ 3 „ „ „
Velvet	„ 3 „ „ „
Natural Grain Matt (White and Cream) ..	„ 3 „ „ „
Egg Shell (White and Cream)	„ 3 „ „ „
Smooth Matt	„ 3 „ „ „
Linen (White and Cream) ..	normal contrast only
Rough Matt (White and Cream)	„ „ „



ILFORD LIMITED, ILFORD, LONDON

ILFORD
CLORONA

The rich mellow effect of a mezzotint engraving can be reproduced on Ilford Clorona. This new warm tone development paper is made in a variety of surfaces to satisfy the most exacting need of the portrait photographer. Clorona has an exceptionally long scale of gradation and renders perfectly the delicate tones of a good portrait negative. The following is a list of the surfaces available (all double weight):—

Porcelain	White
Linen	"
Rayon	"
Natural Grain	"
Satin	"
Porcelain	Cream
Linen	"
Satin	"
Rayon	"
Rough Satin	"
Rough Matt	"
Natural Grain	"

ILFORD LIMITED, ILFORD, LONDON

SELO

THE FAST FILM

It may justly be said that the success of Selo Roll Films has been phenomenal, which is undoubtedly due to the fact that Selo offers a photographic quality never before available. For speed, latitude, and colour sensitiveness, Selo Roll Films have no equal. The Selo series of Roll Films now comprises, in addition to the original standard film, Selochrome and Selo Panchromatic Films. The amateur photographer has therefore at his disposal a selection of perfect quality films, all of which can be depended on for unfailing reliability and uniform good quality.



Distributed by
ILFORD LIMITED, ILFORD, LONDON

SELO

THE FAST FILM

SELO. Standard, the original fast film, possessing great latitude and colour sensitive properties. The perfect amateur film.

SELOCHROME. An extra fast, highly orthochromatic film, multicoated and having an anti-halation backing. Will enable the photographer to use his camera more hours of the day, and more days in the year. Will do much towards prolonging the photographic season.

SELO PANCHROMATIC. Evenly sensitive to the entire visible light spectrum, of high speed and uniform quality. When relatively correct rendering of colour is required, the use of Selo Panchromatic Film is essential. The serious amateur photographer will be delighted with the advent of this film.



Distributed by

ILFORD LIMITED, ILFORD, LONDON

ILFORD

Photographic Accessories

The following is a selection of photographic chemicals and accessories which Ilford Limited supply. A complete list will be gladly forwarded on application.

Ilford Dark Room Filters.
Ilford Colour Filters.
Ilford Exposure Meter.
Certinal (Ilford Concentrated Liquid Developer).
Ilford Professional Developer.
Ilford M.Q. Packet Developer.
Ilford Clorona Developer.
Ilford Acid Hypo Fixing Salts.
Desensitol (The Ilford Desensitiser).

The following publications are issued by Ilford Limited :—

Ilford Manual of Photography.
Panchromatism (with Colour Chart).
Ilford Manual of Process Work.

The following booklets will be supplied free on request :—

The Triumph of the Selo Film.
Ilford Lantern Plates.
Ilford Plates and Films.
Exposure Tables.
Colour Filters.
How to use Ilford Bromide Paper.

ILFORD LIMITED, ILFORD LONDON

Telegrams : "Plates, Phone, Ilford" Telephone : 3000 (20 lines) Ilford

CODES:
A B C 4th, 5th & 6th EDITIONS
MARCONI INTERNATIONAL
BENTLEY'S COMPLETE PHRASE CODE
BENTLEY'S SECOND PHRASE CODE
ILFORD LIMITED 'PRIVATE'



IMPERIAL



PLATES

IMPERIAL DRY PLATE CO., LTD.,
CRICKLEWOOD, LONDON, N.W.2.

Telephone: GLADSTONE 4286. Telegrams: "IMPEOPLE, CRICKLE, LOND

IMPERIAL PLATES

are famous all over the world for their wonderful uniformity, freedom from fog, fineness of grain, and for ease of manipulation. In addition they possess extraordinary keeping powers, and are reliable under all conditions.

They are made in a wide variety of grades to meet every photographic requirement. A selection of the most popular grades is given in the following pages, but full details of all Imperial Plates will be forwarded on application.

IMPERIAL DRY PLATE CO., LTD.
CRICKLEWOOD, LONDON, N.W.2

IMPERIAL PLATES

of Supreme Speed

The following varieties of Imperial Plates are famous for their great rapidity combined with remarkable scales of gradation, ensuring suitability for many different methods of printing. They are very uniform and easy to manipulate. Specially useful for the studio, the press, and all occasions where lighting conditions may be difficult.

Imperial Eclipse Soft Plates	H. & D. 850
Imperial Eclipse Ortho Soft Plates.. ..	H. & D. 850
Imperial Eclipse Panchromatic Soft Plates..	H. & D. 850
Imperial Eclipse Plates	H. & D. 650
Imperial Eclipse Ortho Plates	H. & D. 650
Imperial Eclipse Soft Plates	H. & D. 650
Imperial Eclipse Ortho Soft Plates ..	H. & D. 650
Imperial Press SSS Plates	H. & D. 600
Imperial Non Filter (New Series)	H. & D. 450

IMPERIAL DRY PLATE CO., LTD.
CRICKLEWOOD, LONDON, N.W.2

IMPERIAL PLATES

of Rapid Speed

In this class are several brands of Imperial Plates featuring good speed for general requirements, ample density and excellent gradation, with very fine grain, making them invaluable where quality of image is essential. They have exceptional latitude, and clean bright negatives are readily secured.

Imperial Flashlight Plates	H. & D. 400
Imperial Press SS Plates	H. & D. 400
Imperial Panchromatic B Plates	H. & D. 350
Imperial Special Sensitive Plates	H. & D. 300
Imperial Special Sensitive Ortho Plates ..	H. & D. 300
Imperial Special Rapid Plates	H. & D. 250
Imperial Special Rapid Ortho Plates ..	H. & D. 250
Imperial Non Filter Plates	H. & D. 225

IMPERIAL DRY PLATE CO., LTD.
CRICKLEWOOD, LONDON, N.W.2



Wellington PHOTOGRAPHIC PRODUCTS

The name of Wellington is synonymous with the highest quality in photographic materials. Brief particulars of a few of the most popular series are given herein.

Fuller particulars will gladly be sent on application.



WELLINGTON & WARD LTD., ELSTREE, ENGLAND

Seltona

Daylight Printing Paper

Print making from one's own negatives is very enjoyable, especially when Seltona is used. There is something fascinating about printing with Seltona; the image can be seen gradually taking form and when it is just a little darker than is required in the finished print, transferring to a plain hypo bath for a few minutes, and afterwards washing completes the process. The result is a perfect example of photographic art. It is indeed a pleasure to print on Seltona.

Wellington & Ward, Ltd.
Elstree *England*



Illingworth's

NEW RAPID BROMIDE PAPER

Made in Single Weight and Double Weight

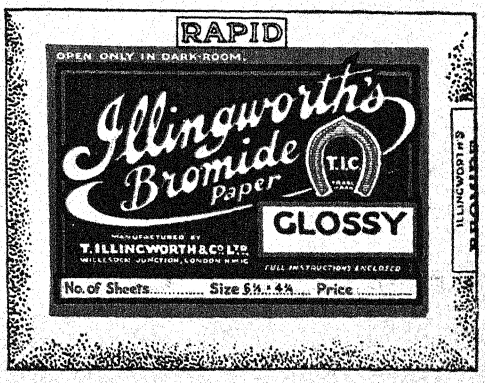
THIS new series has been introduced to meet the demand for faster bromide papers for use with vertical enlargers. It retains the characteristic Illingworth quality and keeps excellently in tropical climates.

SINGLE WEIGHT
Rapid Glossy Normal
Rapid Glossy Contrasty
Rapid Platino-Matt Normal
Rapid Zelvo Normal
Rapid Zelvo Contrasty
Rapid Smooth Ord. Normal
Rapid Rough Ord. Normal

DOUBLE WEIGHT
Rapid Glossy Normal
Rapid Glossy Contrasty
Rapid Platino-Matt Normal
Rapid Zelvo Normal
Rapid Zelvo Contrasty
Rapid Cream Rough Satin Normal
Rapid Cream Rough Satin Contrasty
Rapid White Rough Satin Normal
Rapid Cream Smooth Matt Normal
Rapid Cream Semi-Matt Normal

Rapid Post Cards also supplied in all usual surfaces.

When ordering, "Rapid" should be distinctly specified, otherwise Normal speed paper will be sent.



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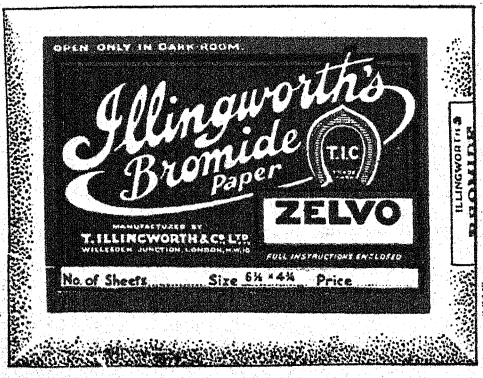
BROMIDE PAPER

IN speed, latitude, and in consistency, Illingworth's Bromide Emulsions prove themselves supreme. They can be forced in development and render complete gradation at both ends of the scale, as well as in the half-tones.

Rough, Smooth, Cream and White in single weight and double weight.

Ordinary	Platino Matt
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SLŌGAS GASLIGHT PAPER

DEALERS who print for amateurs, and amateurs themselves, find their ideal in 'Slōgas'—for these reasons:

It is clean, fast, reliable.
Keeps regular standard of contrast.
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Never fogs. Never stains.

For AMATEURS: Vigorous and Soft—each in three surfaces, Glossy, Matt and Satin Art.

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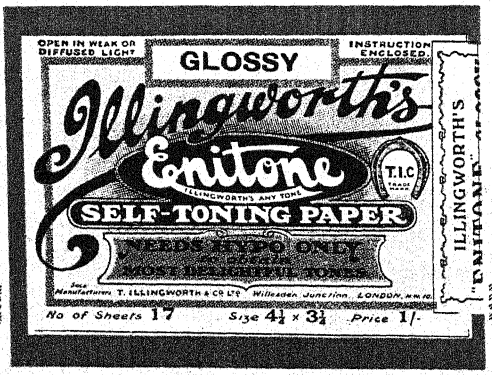
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ENITONE

THE name speaks for itself. Enitone is a daylight printing paper giving beautiful tones from red to purple by fixing in hypo only. Enitone is delightfully simple to use—printing is done in daylight; the image is seen growing, and when sufficient depth is reached, the print is transferred to a plain hypo bath in which it tones and fixes.

Enitone is a printing paper of very high quality, and is made in the following grades:

Glossy, Matt, Satin.





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ORKS - WARLEY, BRENTWOOD, ESSEX, ENGLAND



Selo Ciné Stock is produced to meet the most exacting requirements of modern cinematography and sound reproduction. The measure of its success may be gauged by the rapidity with which Selo stock is being adopted in leading studios.

SELO CINÉ POSITIVE FILM



A fine grain positive stock remarkable for its cleanliness and clear-cut renderings, ensuring sparkling results even from indifferent negatives. It is exceptionally quick drying.

SELO CLEAR SOUND TRACK POSITIVE FILM



Sound reproduction on a dyed positive base (such as is commonly used in silent films to obtain "tint effects") is not entirely successful, owing to the fact that the dyes used are detrimental to sound reproduction and are obstructive to the light action upon the photo-electric cell. The problem has been dealt with in some sound reproductions by weakening the dyes. Results were only successful up to a point.

SELO Clear Sound Track Film entirely overcomes this mediocrity. SELO film is dyed AFTER SLITTING AND PERFORATING over the area which carries the picture, leaving a clear strip at the side for the sound record, thus ensuring sound reproduction that is absolutely pure and unimpaired, no matter what colour effects or intensities may be introduced into the picture.

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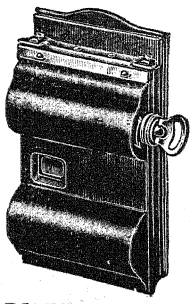
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SANDS HUNTER & CO. LTD.

The "ROLEX" ROLL FILM HOLDER

converts a folding plate camera into a Roll-Film camera. The **Rolex** is extremely well made and takes the universally popular 2¼ in. Roll-film of 6 or 8 exposures. It is supplied to fit most 3½ × 2½ in. or ¼-plate cameras, made to take single metal plate holders. The **Rolex** is also supplied to fit 9 × 12 cm. cameras for 3¼ in. (¼-plate) Roll-films. Price **15/-**

PRICE 12/6

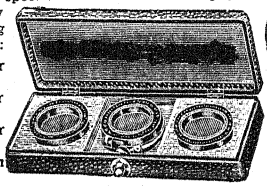


The **Rolex** is supplied from stock to fit double plate holder models of Thornton-Pickard Reflex cameras. Prices 3¼ × 2½ in. size **£1 5s.** 4¼ × 3¼ in. size for 3½ × 2½ film **£1 10s**

Rhaco YELLOW FILTERS

are made of yellow-dyed optical glass of imperishable, unfading colour. They cannot be affected by cold, heat or damp. To meet the requirements of amateur photographers sets of three filters of increasing density, marked Nos. 1, 2 and 3, have been assembled. Their factors are 2x, 4x, and 8x, approximately, on normal plates, film packs or roll films. These filters are mounted in a metal rim and snap interchangeably into the special Rhaco holder which grips the lens mount firmly by means of spring clips. To fit on lens:

1-in. dia. or smaller **£0 18 6**
1¼-in. dia. or smaller **£1 1 0**
1½-in. dia. or smaller **£1 10 0**
2-in. dia. or smaller **£1 19 0**



The "DIST" DIRECT DISTANCE METER

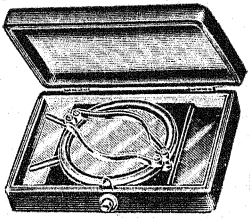


This meter makes incorrect focussing impossible. It tells you to an inch how far your subject is away from the camera. Simply set the "Dist" to suit your individual sight, focus on the object and the exact distance is automatically recorded on the scale. Range 1-50 ft. Complete in hand-sewn leather case ... **£2 2 0**

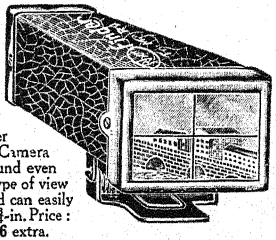
Rhaco GRADUATED FILTERS

prevent the clouds in landscape views being over exposed. They are graduated from clear glass to a 4x filter. The Revolving holder allows of the use of the filter for vertical or horizontal views without removal from the lens mount. To fit on lens

1-in. dia. **£0 12 6**
1¼-in. dia. **£0 16 0**
1½-in. dia. **£1 4 6**
2-in. dia. **£1 8 6**



Rhaco DIRECT VISION View Finder



This new Direct Vision View Finder can be instantly clipped to any Hand Camera of the folding type. It will be found even more useful than the wire frame type of view finder. Thoroughly well made and can easily be carried in the pocket. Length 2¾-in. Price: **8/6.** Leather or Purse case **1/6** extra.

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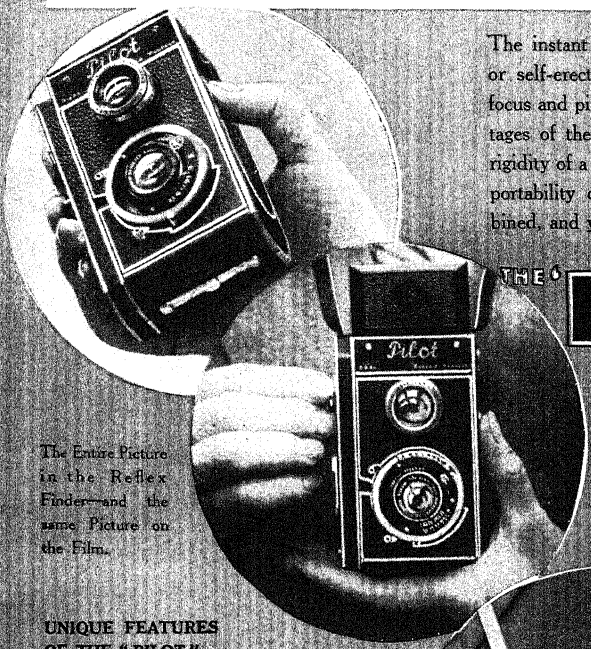
THE WORLD'S SMALLEST REFLEX

The instant readiness for use of the box or self-erecting camera, the certainty of focus and picture of the reflex, the advantages of the simple roll-film camera, the rigidity of a large camera and the extreme portability of a miniature camera combined, and you have

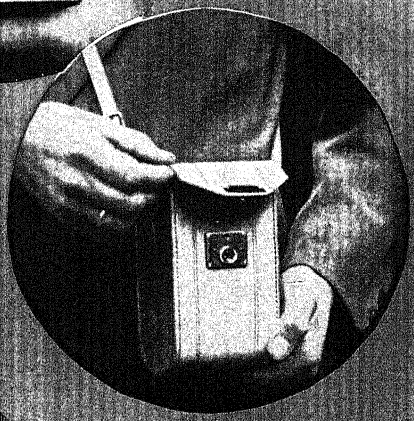
THE PILOT

GIVES 16 EXPOSURES 1¼ × 1¼ in. ON ANY MAKE OF V.P. FILM.

Weight, including case 1¼ lb. Size, 5 in. × 2¼ in. × 1½ in.



The Entire Picture in the Reflex Finder—and the same Picture on the Film.



UNIQUE FEATURES OF THE "PILOT."

1. Ultra-small size. Not larger than two matchboxes stood end on end.
2. Self-opening. You press a button, and the Pilot is ready for use.
3. A Reflex! You see the actual picture you are taking.
4. Magnifier on hood for critical focussing.
5. Large focussing head—no fiddling adjustments.
6. Finder for upright pictures at eye level.
7. Simple and rapid change of film by lever.
8. Handy oblong pictures. The great majority of subjects are taken this way.
9. Extreme simplicity in manipulation.
10. Compact shape. Lies firmly in the hand.

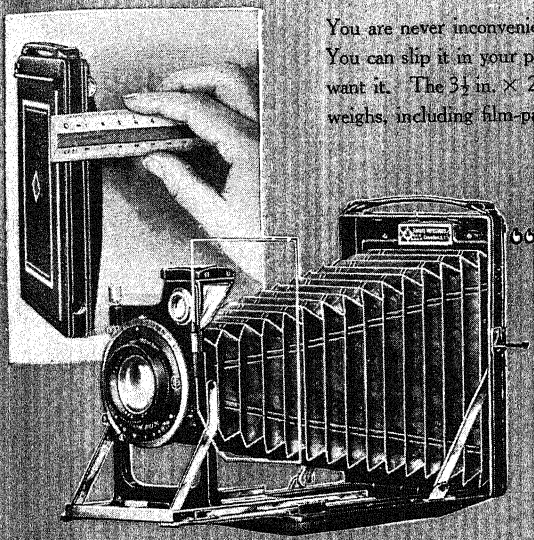
KAMERA WERKSTÄTTEN

GUTHE & THORSCH DRESDEN-A Bärensteinerstr. 30

Prices and full particulars from the Distributors for Great Britain:

SANDS, HUNTER & CO., LTD., 37, Bedford Street, STRAND, LONDON.

THE THINNEST CAMERA IN THE WORLD



You are never inconvenienced by a Patent Etui Camera. You can slip it in your pocket and forget about it till you want it. The 3½ in. × 2½ in. Etui is only ⅝-in. thick, and weighs, including film-pack holder, under 16 ozs.

THE PATENT

"ETUI"

The uniquely designed angle supports of the lens front are a unique feature of the Patent Etui camera. This, combined with the rigidity of the camera body, ensures the lens being absolutely parallel to the focussing screen, a feature not found in any other camera of the same type.

SELECTED IN PREFERENCE TO ALL OTHER CAMERAS FOR USE ON THE KANGCHENJUNGA AND MOUNT KAMET EXPEDITIONS

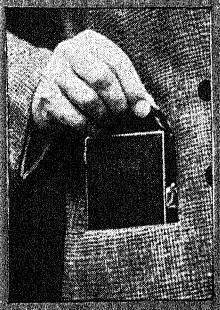
Mr. F. S. Smythe, "The Times" correspondent with the 1930 Kangchenjunga Expedition and the leader of the British Himalayan Expedition, which succeeded in reaching the summit of Mount Kamet, 25,447 ft. high in 1931, selected Patent Etui Cameras in preference to all other cameras for his personal use, and writes as follows:—

Badrinath, United Province, India.
July 31st, 1931.

Messrs. Sands, Hunter & Co., Ltd.,
London, W.C. 2.

Dear Sirs,—The Etui Cameras have behaved splendidly throughout. In spite of their apparent fragility they seem capable of putting up with any amount of hard wear. One camera, the small one, has now completed two expeditions and is as good as ever.

Yours sincerely,
(Signed) F. S. SMYTHE.

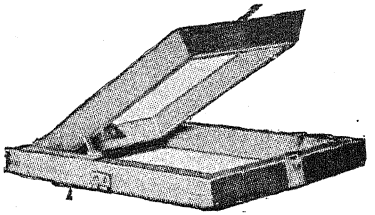


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SANDS HUNTER & CO. LTD



The "PEARSON"

POSTCARD HOLDER. British Made

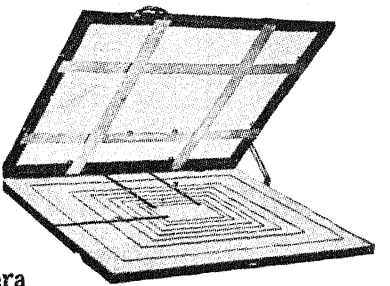
Instantly attached to enlarging easel, easily removed. Suitable for any type of enlarger. The "Pearson" Postcard Holder consists of a hinged double frame, the outer frame holds the bromide card and is provided with a lever which lifts the card after exposure. Price **15/-.** Larger sizes: 6 × 4¼, **21/-**; 6½ × 4¾ **21/-**; 8 × 6 **25/-**; 8½ × 6½ **25/-** 10 × 8 **30/-.**

The "AUTOFIX"

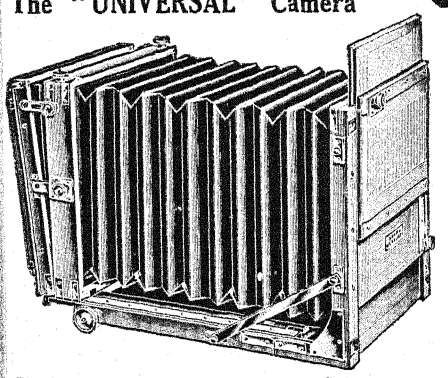
PAPER HOLDER. British Made.

Busy professionals find the "Autofix" Paper Holder an indispensable part of their enlarging equipment However thick or curled, the bromide paper is held flat without the use of pins or glass. The enlargements have clean white margins which can be from ⅛" to 1" wide. For vertical or horizontal enlarger.

10 × 8	£1	17	6	12 × 10	£2	5	0
15 × 12	£2	10	0	20 × 16	£2	17	6



The "UNIVERSAL" Camera



British Made.

The Square Bellows Universal Camera is the most practicable apparatus for professional and technical photographers, for whose needs it has been designed. The Rising Front allows of more rise to the front than in any other camera of this type. Made of well-seasoned Spanish mahogany, best quality leather bellows, double swing and reversible back, radial pattern rack and pinion fittings. These cameras can be supplied brass bound for use in tropical countries.

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	extra				extra		
1/1 plate size ...	£2	10	0	10 × 8 in. size	£3	0	0

Any make of Lens supplied.

Prices with 3 Plate Holders.				Extra Plate holders.		
6½ × 4¾ ...	£14	10	0	£1	14	0
13 × 18 cm.	£16	0	0	£1	16	0
8½ × 6½ ...	£18	0	0	£2	5	0
10 × 8 ...	£23	0	0	£2	17	0
18 × 24 cm.	£23	0	0	£2	17	0
12 × 10 ...	£28	10	0	£3	10	0
24 × 30 cm.	£28	10	0	£3	10	0

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THE PHOTOGRAVURE ILLUSTRATIONS in this volume have been engraved and printed in the VANDYCK QUALITY GRAVURE, which is widely known as the highest grade produced.

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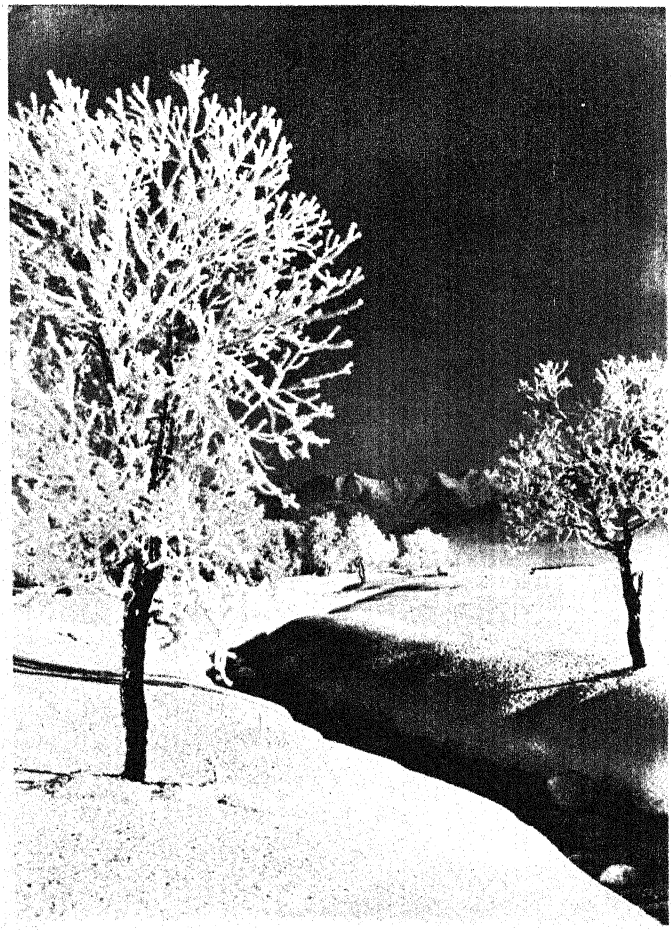
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1932

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Hon. F.R.P.S

HENRY GREENWOOD & CO., LTD., PUBLISHERS,
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The present crown 8vo format was adopted for the 1866 issue, which was the first to be sold exclusively as a separate publication.

Successive editors of the Almanac :—

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PHOTOGRAPHY OF TO-DAY

BY THE EDITOR.

In a later section of this book will be found résumés, in various degrees of fullness, of contributions by which the practical working of photographic processes has lately been advanced. The more or less fixed plan of this "Epitome of Progress" renders it somewhat difficult to dwell on matters of a more general kind or to emphasize the directions which the photographic manufacture of apparatus or sensitive materials is taking. Hence, in this article, I may usefully bring together some notes setting forth in their due prominence what seem to be the chief items which mark the progress of photography from its level of a year ago. If there is less to be said than might be desired, it must be put down to the fact that photography, both amateur and professional, has not experienced anything of late years to alter its methods in any material respect.

THE TREND IN HAND-CAMERAS.

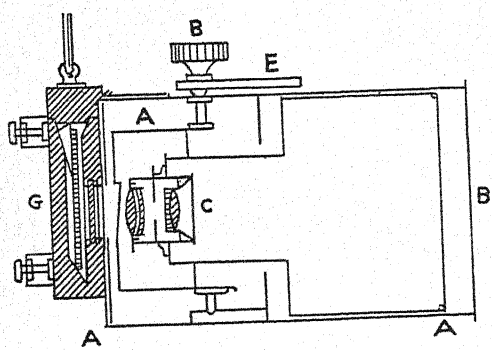
The past year has witnessed notable developments in the design of cameras which are conveniently classed as "miniature," that is to say cameras taking very small pictures, somewhere about 1½ inches square. The craze for portability and for ultra convenience in use, coupled with the reduction of "running costs," has no doubt prompted the introduction of these kinds of camera, which have become available in quite a series of designs contributing in various ways to efficiency in use within the limits imposed by their extreme portability. Thus the user can choose between instruments which are fixed-focus (with adjustment for the focussing of very near objects), those which are of the reflex pattern with a mirror which swings up and down in the usual way, and those of reflex twin-lens construction, in which the second camera forms the finder and keeps the picture always in view, whilst allowing of the focussing of the very closest objects. Examples of these various types have already proved popular, and detailed particulars of them will doubtless be found in the advertisement pages of this book.

Until the advent of these miniature cameras, the amateur who sought to obtain in one instrument the means of making reasonably sure of a satisfactory picture from every exposure and at the same time required to take his snapshots even when the light was poor, had practically only one choice, viz., a reflex camera. Yet a reflex camera of box pattern in the smallest size ($3\frac{1}{4} \times 2\frac{1}{4}$ ins.) in which these cameras are made is too bulky for the exacting demands of the innumerable people who now want to take a camera with them wherever they go. And so the miniature camera, in one form or another makes for much better photography, and if it does not provide those "movements" dear to the heart of the more serious amateur it enables those with very little experience to bring back films with a picture as the result of practically every exposure which is made.

Genesis of the Miniature Camera.

When one looks with admiration on these miniature cameras of 1932, one may be allowed to remind their users of the very remarkable work of a British astronmer, C. Piazzi Smyth, who, in the sixties of the last century, himself made negatives of this ultra-small size, and challenged the photographic world of his day with the prophesy that the camera of the future would take a negative no bigger than 1 × 1 in., and would itself be little bigger than a pill box. We have realised (practically) the one ideal, if not the other, and hence it is very interesting to see the means which Piazzi Smyth employed for taking negatives measuring only 1 × 1 in., yet capable of giving enlargements measuring several feet each way. The occasion of this largely forgotten triumph in photography was the taking of photographs of and in the Pyramids of Egypt. Remember that in those days there were no dry plates, ready made for exposure in the camera. The sensitive material, either a wet collodion plate or sensitised paper, had to be prepared on the spot—an operation of extreme difficulty, owing to the high temperature and clouds of fine dust and sand. Thus Piazzi Smyth was led to see what he could do on a tiny sensitive plate because of the possibility, with this latter, of sensitising the plate whilst completely protecting it from the dusty atmosphere. I reproduce here a drawing, in side section, of his camera, published in the "British Journal of Photography," 1866. The camera AA was a box in which slides an inner box B, carrying the lens C, the inner portion being moved to and fro by the operation of the lever E. But the essential part of the camera was the detachable back G, which is an ebonite tank, with glass

front, which held the sensitising bath of silver nitrate. The collodionised glass plate was rendered sensitive in this solution and exposed whilst still remaining immersed. As shown in the drawing the bottom of the tank was cut to an angle, and two platinum points were provided at the bottom (and another at the top) so as to hold the plate exactly at right angles to the axis of the lens. The drawing indicates the ebonite wedge by which the plate was pressed forward against the three platinum stops.



Using a lens of 1¾ ins. focal length, Piazzi Smyth was able to make negatives which, as the contemporary accounts show, gave large pictures equal in quality to those taken with the large cameras commonly used at that time, viz. of 10 × 8 ins. size and larger. Dr. John Nicol, who exhibited this camera and the results obtained with it at the Edinburgh Photographic Society, astonished the members by the enormous size of the enlargements from these exceedingly small negatives.

Perhaps it is not surprising that this *tour de force* of the sixties was soon forgotten. Those were the days when bulky apparatus and a whole paraphernalia of dishes and bottles were regarded as the ordinary outfit of the photographic tourist. Makers of cameras and lenses had their eyes set on altogether different aims, and thus this ideal of the ultra-small negative was lost sight of. It should be added that Piazzi Smyth, who was an optician as well as a photographer, added a further perfection to the camera which I have described. He used as the front of the glass cell which contained the sensitive plate a lens which corrected the defects of the camera objective. This combination, which of course is now an optical curiosity, was in fact the germ of the modern anastigmat.

Will Cameras be Smaller?

Very likely many an intending buyer of one of these cameras taking very small pictures will wonder whether the final limit in smallness has been reached. On this question I have no doubt that the resources of camera makers are quite equal to the production of instruments of precision even smaller than those which have now become roughly standardised at about the size of 3 × 4 cm., namely $1\frac{1}{2} \times 1\frac{1}{4}$ ins. But, on the other hand there are, I think, a number of very excellent reasons for believing that any further reduction in size would be without practical advantage. In the first place, the making of camera body, shutter, lens and everything else becomes super-proportionately costly as the dimensions are further reduced. Then, a camera which is very small indeed is more difficult to hold with the steadiness which is essential for obtaining the ultra-fine definition which is necessary. We can take it that the user of any ultra-small camera requires the final results in the form of enlargements of about post-card size. From a 3 × 4 cm. negative, this means a degree of enlargement slightly less than 4 times. From a negative of half the present size the enlargement would be 8 times, a scale which would render any mechanical defects such as spots and scratches most objectionably prominent. Then again, enlargement on a scale much above 4 means greatly prolonged exposures in the projection printer, unless the negatives are perfect in their thinness and brilliance. It is easy to understand that neither the amateur himself nor the trade firm would relish the job of turning out enlargements from the many dense negatives which are bound to occur through errors in exposure and development.

While density can readily be overcome with extra power of light in contact printing, the conditions would be much more trying if enlarging on a scale of 8 or thereabouts had to be the usual practice.

The conclusion is that so far as one can judge, cameras taking pictures still smaller than those now available would be of no real advantage to the user. They would necessarily cost a good deal more, and any saving in film would be off-set in the greater cost of making prints.

Two-Picture Cameras.

A new feature which has lately made its appearance in hand cameras for roll film is that which provides the user with the choice of making the ordinary number of full-size exposures on the spool of film or twice the number of pictures

of approximately half-size. This is made possible by the very simple device of a thin metal mask which is laid in the camera back before loading, and covers half of each normal section of film. As embodied in a camera made by Messrs. Voigtländer, the film is wound on the required lesser distance for half-size pictures by providing an extra ruby window in the camera back. With the mask removed there is no difference in the ordinary use of the camera, and no doubt the feature is one which will be appreciated by those anxious to economise in film on certain occasions.

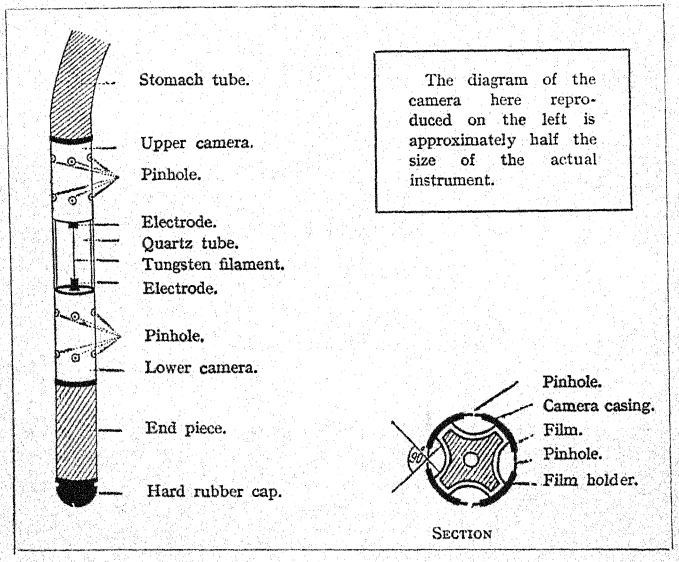
A Wide-Angle Camera.

Among cameras for technical or commercial use the only new type which can be signalised is one due to the inventive mind of Mr. David Charles, and introduced by the Kodak Company. The design, though exceedingly simple, is highly original, for the camera is merely a shallow box accommodating a holder for $8\frac{1}{2} \times 6\frac{1}{2}$ ins. plates, and a wide-angle lens of slightly less than $3\frac{1}{2}$ ins. focus and maximum aperture of $f/18$. The angle of view which is covered is thus slightly more than 110 deg. No focussing movement is provided nor required, since objects as close as 4 ft. are sharply rendered. Thus, in use, the camera can be put right in the corner of a room, so that every inch of space is utilised in taking a confined subject. The construction is such that it can be laid flat against a wall and held in place with the hand for the exposure; or it can be laid flat on the floor to photograph a ceiling, or against a ceiling or top of a doorway to photograph objects on the floor. Insasmuch as a chief advantage of the camera is the fact that it is not necessary to get behind it to focus on the ground glass, special means are provided for ascertaining the extent of subject included in the photograph. For this purpose a frame carrying a rectangular mask is fixed at a short distance in front of the lens. With the camera in position, the operator moves from the centre towards the margin of the subject, observing that, as he does so, the lens gradually becomes hidden by the mask. The point at which the lens is no longer visible is the extreme part of the subject which will be included in the photograph.

The Stomach Camera.

But if there has been nothing revolutionary of late in cameras for ordinary photography, the same cannot be said of a most remarkable instrument invented last year by three technicians of the University of Vienna, F. G. Back, J. Heilpern and O. Porges. It is a camera which instantaneously takes eight

stereoscopic photographs of the walls of a patient's stomach. It is a triumph of mechanical, electrical and photographic ingenuity. As shown in the illustration, it is a tube of just under half an inch in diameter and three inches in length. Midway is the "lamp" by which the exposures are made and consisting of a tiny filament of tungsten in a quartz tube. On application of an electric current a tiny arc of light is produced for a period ranging from 1/100 to 1/10,000 of a sec. —a light which is chiefly blue and ultra-violet.



Above and below this light-source are the batteries of eight stereoscopic "cameras," four above and four below. As indicated in the smaller sectional drawing, these cameras are arranged so that, between them, they include in the field of view the entire circumference of the internal surface of the stomach.

And the "lenses"! They are pinholes of diameter ranging from 1/800 to 1/500 inch, made in thin platinum sheet. Taking into account the distance of the sensitive surface, these "lenses" work at an aperture of from *f*/60 to *f*/100, yet so intense is the tiny electric flash that the sensitive film records its subject in the minute fraction of a second already

mentioned. This photographic efficiency was not obtained without a great deal of experiment in the choice of sensitive film. Since the small negatives (about $\frac{1}{4} \times \frac{1}{2}$ in.) require to be very considerably enlarged, a film of very fine grain is necessary. At the same time, shortness of exposure calls for exceptional sensitiveness to the ultra-violet rays. It was found that these two requirements were satisfied by the Gevaert Special cine film.

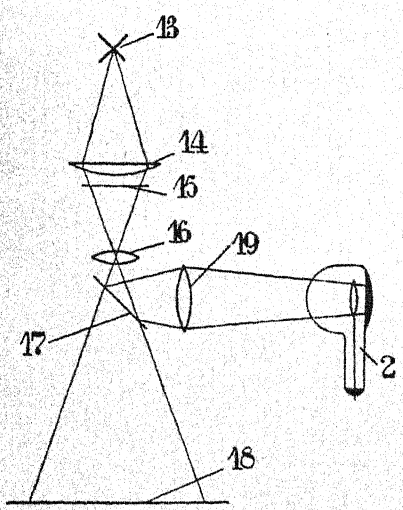
The stomach camera is not fitted with any shutter. The bits of film are laid in place (in the dark-room) in the recesses shown in the sectional diagram, and the camera introduced into the patient's stomach by yellow light, which allows of the necessary manipulation, but does not affect the film on account of the very small aperture of the pinhole "lenses." The exposure is made by firing the lamp, the electrical arrangements being contrived to avoid any shock to the patient. The little negatives are enlarged to a size suitable for stereoscopic 45 × 107 mm. picture mounts. In consequence of the closeness of the subject relatively to the separation of the taking "lenses," a greatly exaggerated degree of relief is seen in the stereoscope, and it is admitted that a good deal of experience on the part of physicians is needed in order to interpret the message of the photographs correctly. A number of gastro-photographs taken in England with this remarkable instrument were shown at the last exhibition of the Royal Photographic Society. They certainly demonstrated the success with which the camera shows the form and structure of the interior of the stomach, and it may be hoped that the benefits which will result from their use will be commensurate with the almost incredible igenuity which has made the camera a practical instrument.

Automatic Exposure in Enlarging.

Turning to another branch of photographic apparatus, I come to certain inventions of the past year which, it is true, have not yet made their way into practical work. But I am told it will not be very long before they do. They are concerned with the exposure of the sensitive paper in a printing box or an enlarger. As everybody knows, the determination of the time of exposure when enlarging or printing on development papers is about the only thing in this branch of work which has not been rendered almost automatic. If and when certain electrical mechanism becomes commercialised, this also will be accomplished; the enlarger or printing box will of itself switch off the light as soon as the printing paper has had the "correct" exposure.

How is this seemingly marvellous result obtained ? Well, electrically it is a highly complicated business, the starting point of which is the photo-electric cell, now of such importance in wireless, television, etc. Reduced to the simplest terms the photo-electric cell is an instrument which transmits a current of electricity, and that current varies in intensity according to the strength of light falling on the cell. Thus the photo-electric cell provides the means of, so to speak, weighing out so much light by first converting the light into electricity through the operation of the cell.

A rough diagram will serve to illustrate how this procedure is applied to an enlarger. The light from the lamp 13 passes through the condenser 14 and the negative 15, is condensed by the projection lens 16 and thence falls on a mirror 17 which reflects a definite proportion of the light to the photo-electric cell 2 and transmits the remainder to the sensitive paper 18.



The principle of automatic action is based on the fact that the quantity of light required for the correct exposure of a given bromide paper can be expressed in terms of electricity. That being so, electrical mechanism, which is far too complicated for me to attempt to describe, serves to switch off the light when this quantity has been given to the paper. The system thus automatically provides for the various fluctuating factors in enlarging, such as power of the light, density of the negative, scale of enlargement and aperture of lens. Those who would like to study the electrical technicalities may be referred to two patents published in the "B.J." of July 31st, 1931. One of them describes mechanism by which not only is the light switched off at the end of exposure, but the bromide paper is wound on to bring a new piece into place. The light then switches on again, and so the cycle of operations goes on, without human attention once the starting

switch of the installation has been pressed. It even cuts off the exposed pieces for development.

It doesn't seem that those employed as trade enlargers have been at all perturbed by the thought that they may lose their jobs through the introduction of these automata. Time will show whether the self-acting machines can replace human skill, but I can certainly say that the inventions are to be taken seriously. There is, however, one respect in which their scope is limited. From what has been said it will have been plain that the measurement of the quantity of light required for the exposure of the bromide paper is based on the sum total of the densities in all parts of the negative. Hence the automaton, if set for negatives consisting mostly of medium densities, would not deal correctly with negatives consisting of a few small areas of heavy density and a lot of practically clear glass, the kind of negative you get from a night subject or a portrait study with extreme back lighting. With such negatives the exposure would not be enough for the high-light gradations. For this reason, apart from the facility for rectifying defects in negatives by shading, etc., the automatic enlarger must needs play second fiddle to the human operator as regards quality, though it may obtain a field of its own on a quantity basis.

Silent Smokeless Flashlight.

While there have been recently notable improvements in the ordinary flash-powders, a new complexion has been put on flashlight photography by the introduction of an altogether new method of producing the luminous flash. It takes the form of a glass bulb about 6 ins. in length and 2½ ins. in diameter, filled with a crumpled mass of exceedingly thin aluminium foil. Aluminium, as is well known, can be beaten out thinner than gold. The metal employed in these flash bulbs is said to be of the extreme thinness of ·00002-in. The bulb is exhausted, and pure oxygen then admitted at low pressure, *e.g.* at 150 mm. of mercury, equal to the pressure of oxygen in the air. Aluminium of this extreme tenuity may be ignited by the application of a very feeble electric current, no more than that from the battery of a 4-volt pocket torch. In the bulb is a capsule serving to ignite the metal, which burns with a highly intense and actinic light and perfectly silently.

In Germany, where these lamps originated under the name of Vaku-Blitz, and in the United States, where they are sold as "Photo-flash," they have had an enormous success. In the latter country, it would almost seem that they have gone

a long way towards abolishing the use of ordinary flash powder. In Great Britain, less has been heard of them, apparently in consequence of difficulties in placing them on the market.

Although a flash by one of these bulbs costs something like 2s., their advantages render them preferable in many respects to the much cheaper flash powder. The complete absence of smoke is an obvious superiority; the speed of the flash—about 1-75th of a second—allows of photographing subjects moving too rapidly for the more slow-burning flash-powder. A further advantage is the ease with which the flash bulb may be synchronised with the camera shutter, so that a press photographer, by operation of a single button, can simultaneously illuminate and snap a close-up subject under any circumstances whatever. The immunity of the flash-bulb from the effect of damp or rain, and the facility with which it can be used in wind or snow, or even under water, open up new branches of photography by artificial light. The flash bulb is, of course, not equivalent in illuminating power to a big charge of flash-powder, and several of the bulbs would require to be used for subjects covering a considerable area. It may, however, be hoped that the bulbs will become available to photographers in the British Isles at prices no more than those which prevail in Germany and America.

Sensitive Materials.

The outstanding feature of the past year in the manufacture of sensitive materials has been the widespread activity in the supply of numerous makes of roll-film and film-packs of much greater speed, enhanced colour-sensitiveness and means for the prevention of halation. The extent of these advances and the facilities which they confer on the users of film cameras are fully dealt with in a succeeding article in this volume, from which it will be seen that those whose photography is done with portable or pocketable cameras now have at their command emulsions which enable the very finest photographic results to be obtained. It is to be hoped that the effect of these advances will be evident in a higher average of quality in the innumerable photographs which holiday makers take for their enjoyment. To that end it should be realised that the variety which now exists among roll-film emulsions, in comparison with their previous similarity, calls for a more individual care in development than can readily be given by the trade firms who undertake this work for the amateurs. Nevertheless it would be rash to suppose that this fact will have any considerable effect in extending the ranks of those amateurs for whom "photo-

graphy" is not merely the use of a camera but comprises also the developing and other processes which delighted a previous generation. With the exception of one or two countries, the idea that photography, apart from pressing the button, is something to be done by proxy appears world-wide.

Pictures after 33 Years.

To turn from the latest roll-films to some of the earliest, just about the time that last year's volume of this ALMANAC was printing it was announced that the discovery of the relics of the ill-fated Andrée balloon expedition of 1897 to the North Pole included rolls of exposed and undeveloped film. Of 20 rolls so found, ten were in a state which allowed Professor John Herzberg of Stockholm to obtain pictures of excellent quality. The latent images on the emulsion had survived thirty-three years' storage under Polar ice and yielded pictures which gave a vivid and poignant record of the experiences of the explorers. It is fairly safe to say that these films, obtained under conditions so completely authenticated, constitute a record for the keeping quality of an exposed emulsion. Such instances are necessarily rare, but there are some others of a similar kind which, in various degrees, may be regarded as authentic. Some 18 months ago it was reported that a chemist in the neighbourhood of Birmingham had developed plates exposed 25 years before, as evidenced by the subjects. Two other cases, vouched for by correspondents of the BRITISH JOURNAL in 1924 and 1925, relate to the successful exposure of plates made 37 and 35 years previously. To these may be added the case of a cut film successfully used 34 years after manufacture.

Printing Papers.

The development papers, bromide and chloro-bromide, continue to hold the field among both professional makers of portraits and those amateurs whose choice is disclosed by the exhibition catalogues. And no one can fail to notice the still further improvements which makers have made in materials already of an exceedingly high standard of quality.

On the often discussed question of the liability of developed silver prints to acquire a film of tarnish in the course of time, an important new light has been thrown by Mr. W. B. Shaw, M.A. As the result of tests of prints made nearly 30 years ago, Mr. Shaw affirms that this change is not, as generally assumed, an inevitable one, due to the action of sulphur impurities in the air on prints however perfectly

made, but is due to atmospheric carbonic acid decomposing residual silver salts left in the film by incomplete fixation. He states that his experiments show that tarnishing only takes place in the case of prints which contain a silver compound left there in consequence of the original fixing having fallen short of perfection. In the case of a number of tarnished prints, he found that treatment with a weak solution of sulphide caused the high-lights to turn yellow, and the whole image to tone to an unpleasant brown colour, thus indicating the presence of something other than pure silver. Mr. Shaw lays stress on the importance of fixing prints in two successive hypo baths if every trace of silver compound is to be removed and suggests a definite limit as to the number of prints which can safely be fixed in given quantities of hypo. He makes the rather startling suggestion that prints should finally be passed through a 1 per cent. bath of soda sulphide for converting any traces of residual silver compound into inert silver sulphide. I am afraid this latter treatment, which is a test for imperfect fixation, would mean the scrapping of a great many of the prints which are made under commercial conditions, but that does not affect the conclusion from Mr. Shaw's experiments that a developed print, if fixed with the utmost (and practicable) perfection, is of a degree of permanence very much greater than has hitherto been supposed. Hence these recommendations deserve to be studied by every user of development papers in the aim of extending to the longest period the pristine beauty of prints made by these processes.

Colour Photography.

It cannot be said that the past year has witnessed any revolutionary development in colour photography. But it has seen something more substantial, namely the establishment as a going concern of a factory solely for the production of prints from colour-separation negatives. After several years of intensive research Messrs. Colour Photographs, Ltd., have perfected in their works at Willesden, London, N.W., a process by which colour prints from existing sets of selection negatives are turned out with extraordinary regularity. The method is the Carbro variety of the carbon process, but so modified and standardised as almost to constitute a new procedure. The practical working has been standardised from start to finish.

As is well known, Carbro during the last few years has proved itself by far the best of existing processes of three-colour printing when handled by those experienced in temper-

ing i t to the effects of variable factors such as temperature, atmospheric moisture, etc. At the Willesden works brains and money have been spent in so stabilising the working conditions that the making of three-colour prints can be done by practically unskilled labour, that is to say by labour capable of carrying out a rigidly prescribed routine. This has been achieved by rigorous control of electric voltage, of temperatures of solutions, of humidity of air, of mechanical operations such as squeegeeing. Mechanism and the clock have replaced human judgment. Thus at the start the densities of the negatives are measured for the two-fold purpose of ascertaining if the set is in correct " balance " for the colour printing and for determining beforehand the times of exposure to be given in the enlarger. The bromide paper is developed for a fixed time at a fixed temperature, with special means for ensuring uniform action of the developing solution. Washing after fixing is done by a visual method of control, a dye being added to the fixing bath in such quantity that the discharge of its yellow colour from the prints indicates the complete removal of the hypo. Prints are washed suspended from tube clips arranged so that a thin stream of water from a series of small holes passes down back and front of each print.

Following expeditious squeegeeing of the bromide to the " sensitised " pigment tissue by a power-driven roller, the bromide-pigment sandwich is left to itself under standardised conditions of temperature and moisture. After removal of the bromides for re-development, the tissues receive their specially prepared sheets of Cellophane (the material used as the temporary support of the component images) and remain with them under pressure until, on " development " in hot water, the original paper base of the pigment is stripped away and the pictures left on the transparent Cellophanes. On drying, these latter exhibit such variety of crinkling and contortion as to make one wonder how they can ever be assembled in exact register to form the finished three-colour prints. But at this next stage they are evened out and fall in place one on the other to a hair's breadth with an ease which has the look of the miraculous, but results from the Company's special treatment for exactly controlling the dimensions of the Cellophane sheets.

The staple business of Messrs. Colour Photographs, Ltd., is photo-printing in natural colours from negative sets supplied, so that naturally they are interested in facilitating the making of these negatives. In view of the drawbacks of the ordinary repeating back for this purpose and of the cost of a one-exposure camera, they have worked out a repeating back which

automatically exposes all three plates (each through its appropriate filter) on the camera lens being uncovered by pressure on the cable release and performs this triple operation in a total period of 2 secs. The device includes provision for varying the ratio of exposures according to the colour-sensitiveness of the plates. It is attachable to any camera of solid build and enables the three negatives for a colour portrait to be made in as short a time as the single one for ordinary portraiture.

Screen-Plate Colour Cinematography.

In colour photography with ordinary cameras, as everybody knows, the ingenious system of a three-colour mosaic filter through which the emulsion is exposed has provided the simplest means for making transparencies in natural colours. As first embodied in the Autochrome plate, and afterwards in the Agfa, amateurs of little experience have found no difficulty in the dark-room manipulation by which the original negative image is converted into a positive by a process of chemical reversal, thus producing a species of photographic mask or stencil which blocks out the colour areas not required for the making of the picture. For the production of motion pictures in colour this system has a great deal in its favour. Its chief drawback has been the difficulty of producing a mosaic colour filter fine enough not to be noticeable at the great magnification of the tiny pictures on the cinema screen. It has, however, been brought to the commercial stage by the enterprise of the well-known firm of paper-makers, Messrs. Spicers, Ltd., who have put down works near Cambridge for the manufacture and emulsion-coating of mosaic colour film covered with bands to the number of 350 per inch. On the occasion of a visit of many Fellows of the Royal Society, a demonstration of the process in working was given by filming numerous parties of the visitors and showing the resulting motion pictures on the screen. Messrs. Spicer have worked out a method of duplicating the master positives by projection printing, and they promise the issue of the film in form for use in ordinary cameras, and also that long desired fruition—a process for the production of prints in natural colours as readily as in black-and-white.

News Pictures in Colour.

But perhaps the event which has most prominently drawn attention to the progress of colour photography is the issue with the *Times Weekly Edition* of a supplement of news pictures which are reproductions of photographs in natural

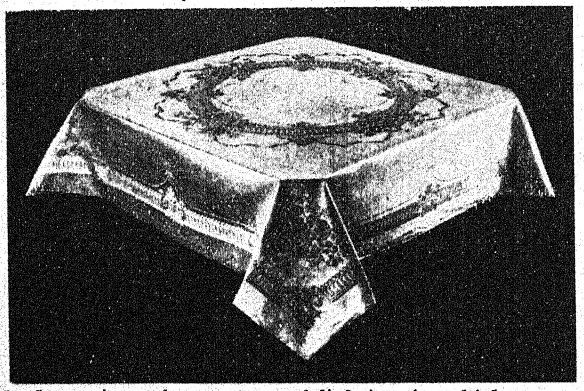
colours. At the time of passing this Almanac for the press this supplement has not been issued—it appears on December 10th—but it can be said that this innovation is the result of recent improvements in the taking of the three colour-separation negatives (simultaneously with a shutter exposure), and the production of the printed pages by an intaglio or gravure process, similar to that used for the pictorial supplements in this Almanac, but done with four successive printings, yellow, red, blue and a black instead of one only. The camera with which most of these snapshots in colour have been taken is one invented by Mr. A. G. Hillman, the rights in which are owned by Messrs. Gerrard Industries, Ltd. The negatives are used direct for the making of the intaglio matrices, Carbro prints being also prepared for the guidance of the machine printer. This is a step forward in illustrated journalism which will be watched with interest, although it cannot be expected that it is one which can be taken at present by a daily picture paper if the public is to have the news in pictures within a few hours of the actual happenings. Nevertheless it is now demonstrated that the colour photographer can do his part of the work with a large measure of efficiency, and it is a question for the machine printer to find means for the transference of the results at sufficient speed to the reels of paper which Fleet Street disgorges from its presses in the small hours.

Commercial Photography.

In a year of financial and trade depression it is encouraging to see the art of the "commercial photographer," or it would be better to say "photographic illustrator," advancing in giant strides. A new photography has arisen, marked by directness and force. If it is often original to the point of eccentricity, one must remember that it is work done to promote the sale of goods and thus is conceived with the single object of making the public sit up and take notice. French artists have undoubtedly taken the lead in this new movement, but England is showing its ability to meet the demands of advertisers who must have the most original photography to present the merits of a soap or a railway or a wireless set.

I am afraid it is impossible to give a description of the methods used in this new photography, for they are of infinite variety. But I should like to find space for a reference to one new ingenious device in the photographing of commercial goods. For the making of photographs of damask and other patterned linen goods it has been usual for makers to weave

special samples, with the pattern in a coloured thread, for the purpose of getting photographs made. A photographer of Kirkcaldy, Mr. Alfred J. Caithness, has, however, worked out and patented a method by which the patterns of these goods, as ordinarily made, can be photographed. The



method consists of a system of lighting in which a number of light-sources and shades are used so as to obtain various oblique illuminations all in the same direction. By the kindness of Mr. Caithness I am able to show a result of this remarkable method.

ANIMAL PHOTOGRAPHY

For those who photograph in the Zoos of London, Edinburgh, Bristol, Dublin, Paris, Hamburg, Berlin, Dresden, Leipzig, Frankfort, Amsterdam, Rotterdam, Antwerp, Copenhagen, Sydney, Melbourne, Adelaide, Perth, Philadelphia, Washington, St. Louis, Milwaukee, and Buenos Aires.

By J. E. SAUNDERS, F.Z.S.

Photography has made big strides in the last 20 years in many directions—but not quite in all.

We have better apparatus, better lenses, better plates and films.

Better work is done by our leading professionals and pictorial workers and we see better Press pictures and better "commercial" pictures—all swelling the aggregate of better photography. Moreover everybody uses a camera of some sort to-day.

But there is one direction in which, as an observer keenly interested in photography of all kinds, I feel that we have not made as much progress as we ought to have done, and that is in Animal Photography.

In my opinion no one in this country has yet excelled the quality of the Zoo work of Gambier Boulton, done 30 or 40 years ago with apparatus and facilities inferior to those at the service of the keen worker of to-day. His photographs are still in demand by artists, by schools, by scientists, by book publishers because of their outstanding merit, not merely as photography but as *portraits of animals.*

Our professional photographers, so far as I can see, have not encouraged sufficiently their public to want photographs of their pets—their horses, their dogs, and cats, their parrots. We don't expect Bond Street Court photographers to seek this work, but there is money in it for the provincial professional, and he can soon earn a name in his district for faithful portraiture of pets which may help his bank balance or reduce his overdraft.

It is easy to be provocative but, instead, let me set out the standard which experience—some of it painful experience, in which I have committed all the blunders which I now condemn—has built up as the standard which I feel should be aimed at in animal portraiture.

The essential " points " for a successful animal or bird photograph are :—

(1) There must be, first of all, a good, adequately-exposed negative as the picture's foundation ;
(2) It must be a " likeness " of that individual creature—a real " portrait " in fact.
(3) There must be no trace of " movement " in the picture ;
(4) The texture of fur or feather should be rendered adequately ;
(5) The modelling must be right—that is, the animal must be rendered in its *right shape*.

Taking one by one the points I have tabulated, the first speaks for itself. A good negative is essential as the foundation for any good picture. Some of us believe that a bad negative never yet produced a good photograph.

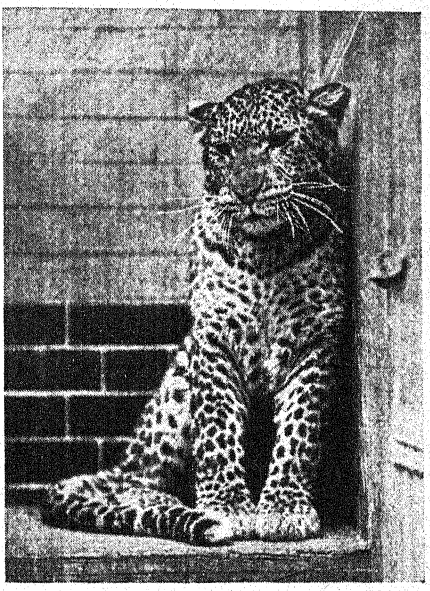
In animal and bird photography you cannot, for instance, get a true rendering, or a satisfying rendering, of the texture in the skin of a dog, the fur of a leopard, the plumage of a bird, the hide of a horse, if you under-expose. There is less excuse for under-exposure in these days of high-speed films and ultra-speed plates and reliable shutters and big-aperture lenses than there was in the old days when films were about 180 H. & D. and we all used 200 H. & D. plates.

In my own Zoo work I find myself using more and more such exposures as 1/25 at $f/5 \cdot 6$, or 1/50 at $f/3 \cdot 5$ for close-ups, on fast film-packs than some of those fancy high-speed markings with which our shutters are decorated for the benefit of the unsophisticated.

Except for such subjects as polar bears and pelicans and little penguins, I treat most animal and bird subjects within 15 feet of the camera as " Dark Objects near Camera," as our exposure-meters put it. And if I am in doubt I award the subject the benefit of the doubt by giving a generous exposure rather than a skimped exposure. You can sacrifice much of the beauty of an animal picture by under-exposing. There are no " soot-and-whitewash " effects in Nature's scheme of decoration for her wild or domestic creatures. The light-and-shade and texture in, say, a leopard's skin

are not as toneless as the simple black and white of a draughtboard. If you make it so by under-exposure your methods are wrong. An exposure meter of reliable pattern is a good friend in animal photography.

A successful animal picture brings out the individual characteristics of the creature. I have known many cats, many wire-haired terriers, many Alsatians, 30 or 40 leopards, and 30 or 40 lions (not too intimately in all cases, let me add) but I have never yet seen two that were alike, any more than I know two human beings who are exactly alike.

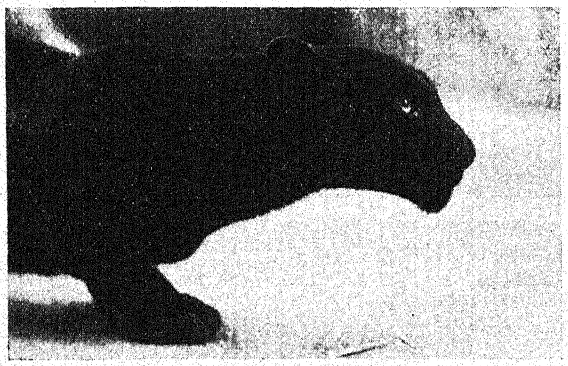


Rex (Rhodesian Leopard), feeling a little upset—a portrait.

Far too many animal pictures show traces of movement in the subject. Photographs of Zoo lions eating, dogs gnawing a bone, or cats wagging their tails a little are not good photography if the traces of those movements show in the finished print. Photographers have calmly said to me more than once, "We don't mind a little 'movement' in the picture so long as the rest of the picture is all right"! But that is not the road to successful work.

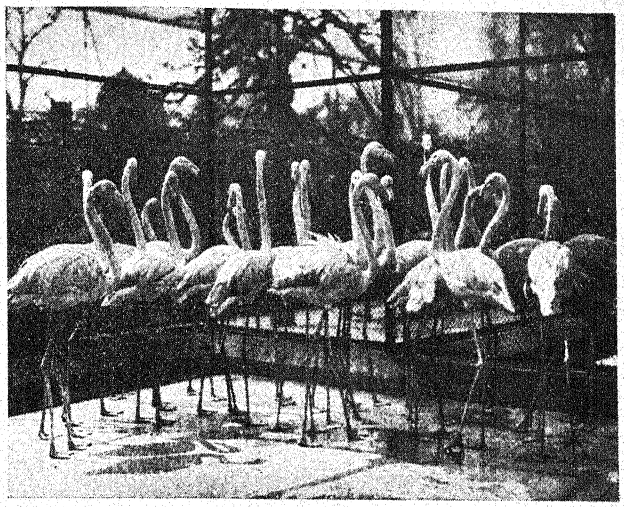
Compromises don't always work well. If a subject demands 1/500 sec. to avoid "movement" and the light is such that under-exposure will result if a shutter-speed shorter than 1/100 sec. is given, it is best to seek some other moment or some other subject rather than get a negative which is (1) under-exposed and (2) ruined by movement. There are some things which photography cannot do, and we photographers should busy ourselves rather with the things that it can do!

We can all agree that in animal photography fur or feather or skin should be rendered as faithfully as possible. Under-exposure is of course fatal here. Lighting can be made to help very materially in this direction. Dead front lighting, in my opinion, is bad: it flattens out the tones too much and in particular cuts out the shadows. Side lighting is far better, for the shadows help towards a better rendering of texture. But often I find that the best position of all is when the lighting is from behind the subject—not dead behind but "three-quarter back lighting," as I have heard it called. To make the meaning clear let us think of the dial of a clock. The animal is in the centre, and the photographer is at the spot occupied by the figure VI. You will find this an easy rule to follow once you have seen for yourself what it means in practice. Get the animal to come to



Maud, the Prince of Wales's black panther—a close-up profile.

rest parallel with your plate, with the light coming from the direction of the figure X on the clock-face, or perhaps from between the figures IX and X. That slight back-lighting can sometimes give an almost stereoscopic relief to the texture of the animal's skin. You mustn't skimp the exposure, of course—a generous exposure is more important in back lighting than when you have the sun full on your victim. This formula for your lighting, plus an adequate exposure, will often give the photographer a portrait which is not only a good likeness of the animal but a striking picture. I won't say "pictorial" because I don't class animal portraits as pictorial in the photographic sense. This lighting is a

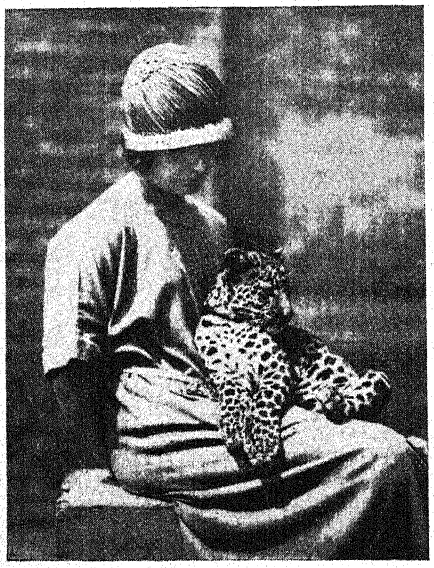


A Group of the Zoo's Flamingoes.

favourite formula of mine for the polar bears (which many render much too white) or leopards or lions. And of course it has the advantage of obviating those ghastly shadows of iron bars, which all too often fall across the animal's body in Zoo pictures. By this trick of back lighting you leave those shadows on the side of the animal which your lens does not see. I have also used this attractive formula often enough in places where there are no bars in the way or shadows of bars to be avoided if possible. It is not just a stunt—it is the right way on occasion.

Last on my list, and perhaps the most important to a serious worker, comes the matter of "drawing"—or let us say "right shape" to express the same idea in everyday language. Most important, perhaps, because this is where so many innocent photographers go wrong without realising the error. We all get wrong "drawing" sometimes. I do, for one, though I ought to know better, and do know better; but I scrap those negatives before they are dry from the washing tank! I have been long enough at animal photography to have made every mistake that is possible, and I hope I know them all by now.

That king of cameras, the reflex, is partly responsible for



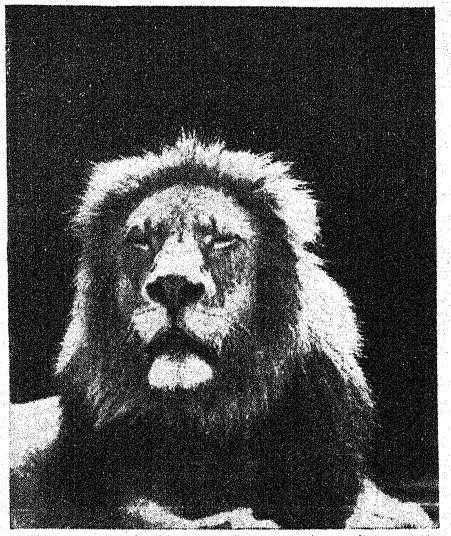
A Pet Leopard.

this error. A reflex tempts us all to essay close-ups of animals, for it enables us to use *f*/4·5 or *f*/3·5 at full aperture through its power of accurate focussing. The reflex also lures us all to go out for the big "head study" to quote the jargon of the photographic clubs. The reflex *when properly handled* is miles ahead of any other camera for animal work, in fact it attracts into animal photography rather too many photographers whose sole qualification for this work is the possession of a reflex! Many of these people seem to overlook the very important fact that the lens of a reflex camera, as ordinarily used, is about 2 ft. below the level of the eyes. This makes a lot of difference.

In seeking to get a head study close up, many photographers are apt unconsciously to tilt their reflexes sharply upward. They see the head occupying a big area of the focussing screen; they see the image dead sharp, and with a sense of triumph they press the trigger. Eureka!! Alas, too often in the thrill of getting the big head of a lion or tiger, and getting it dead sharp (without movement too!) they have overlooked one vital point—drawing. They have got the animal's head wrong-shaped. The result may be *a perfect negative*, considered solely as a negative, but often enough it is acclaimed by its maker as a real triumph! It may even win a medal at the word of a pictoralist. Some of them have.

I have seen heads of lions and tigers and leopards with an elongated nose; or with the nostrils quite out of shape and the forehead dwarfed almost to vanishing point; foreshortening here, exaggeration there. I have seen pictures of old friends

in the Zoo lion house, taken with a reflex, which seemed to have been pointed up the creature's nostrils as though to photograph his adenoids, if any—"the adenoid viewpoint" I call it! I have seen pictures of my greatest favourite of all, Rex, the famous leopard, which rendered his head in such a shape that if it had been true he would assuredly have been killed at birth by his mother!



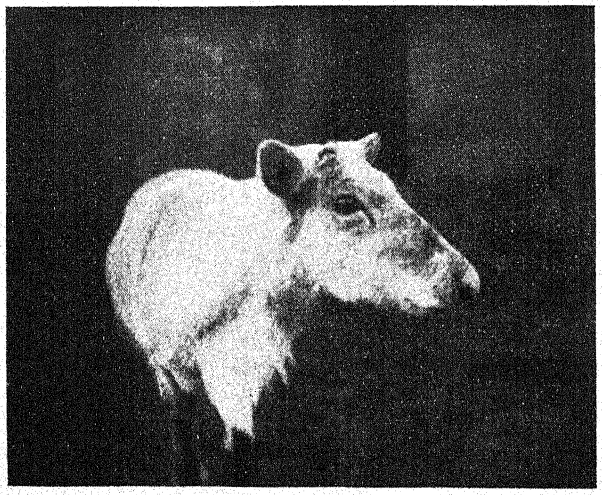
What to Avoid—The wrong moment (eyes shut, head thrown back).

The remedy in some cases is to stand on a chair to get your picture or get the animal down nearer to your level.

You can tilt your camera upwards without going far wrong when the object is not too near, but you cannot do it with impunity when the animal is a large animal *close to the camera.* I used to do it in my early days with a reflex, but a clever observant animal sculptor, to whom correct modelling is everything, hammered away at my poor pictures and drove me into the right path. Now I am ever on my guard against this little weakness.

Besides, after visiting certain animals in the Zoo for about six days a week for 11 or 12 years, one knows them so well that any such error would not escape me, and even if it did it would never escape the keen eye of my co-worker, Miss Callow, whose acute perception could detect the blunder before my negative had finished its washing.

The waist-level point of view is often a "photographic crime," and never more so than when it is wrongly employed in animal photography. There is a special tendency to employ it wrongly in zoo work because quite a number of the creatures live on raised floors, so that the public may



Another awful example—an end-on close-up.

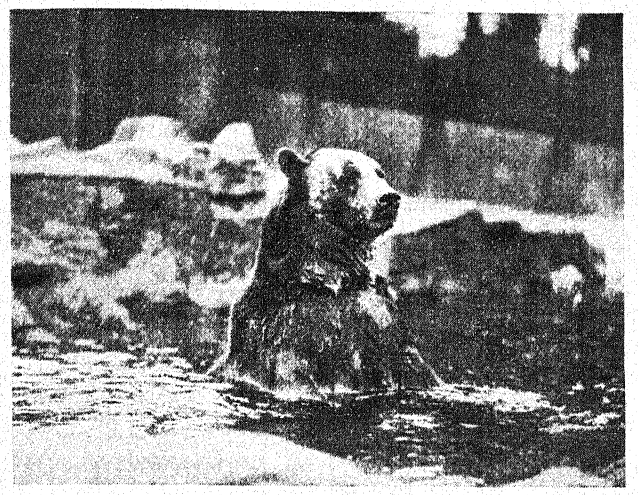
see them. That fact is not conducive to easy photography. Again many of the birds perch at a level considerably higher than your waist, and you would get very poor "drawing" of them from the low view-point.

You have the choice of raising your camera higher than waist-level or of getting the creature down to your level, or something approaching it. The second is my favoured policy, and this of course, is where it is helpful to be known to the creature. The keeper may be able to do for you all that a stranger needs in these circumstances.

There are, it is true, reflex cameras which can be used at eye-level, but rarely do I see them used that way.

The waist-level view-point has its pitfalls, if you seek true portraiture, and the reflex user with his camera at waist-level should always ask himself (if the animal gives him time to think) whether the image on his focussing screen shows the animal in its right shape.

Incidentally this is a point where we 5 × 4 workers may sometimes score over the photographer who relies upon the much smaller picture of the $3\frac{1}{2} \times 2\frac{1}{2}$ camera. My Graflex 5 × 4 focussing screen, showing me the big bright image cast by an 8-inch $f/3{\cdot}5$ lens, reveals the fact at once if through



The Grizzly's Bath.

any reason I have got my victim at an awkward pose which would mean "wrong shape" or wrong modelling in the picture. The $3\frac{1}{2} \times 2\frac{1}{2}$ picture does not always reveal the error so unmistakably, even when the photographer is fairly familiar with his task. That is one very good reason for preferring the larger camera.

I still regard the reflex as the animal photographer's best camera, though I occasionally use my 10 × 15 cm. Minimum Palmos (alas no longer made) or a small roll-film camera with direct vision finder or my jolly little Dallmeyer Speed camera (with its *f*/2·9 lens) using Ilford Soft Gradation Pan plates for dull-light shots and interior attempts. But my favourite instrument is my trusty Graflex with its *f*/3·5 and its 17-inch Dallon, with the marks of more than one set of claws and talons on the camera body as well as the scars which arose when a friendly leopard tore the front out of it in a mischievous moment.

The reflex should be the faithful servant of the photographer —not his master.

Another frequent case of "wrong shape" is the three-legged quadruped. If a lion is sitting you obviously do not get all his four legs into the picture, nor are you expected to do so. If an animal with fluffy legs is standing on all fours you may

not get all his four legs showing as separate units. But any dog or horse or zebra or animal with clear-cut legs, standing on all four, should have all four unmistakably visible in the print. Few animal pictures are more grotesque than a zebra or hippopotamus standing with two legs dead in line so that half of the creature in the picture appears to be standing precariously and uncomfortably on one leg. The zebra appears to be a frequent victim of this error even



The Bateleur Eagle "showing off."

in books with reading matter that is really authentic! The remedy of course is to move a yard to the right or left before pressing the trigger—just enough to let that essential fourth leg come within the purview of the lens.

The last case of "wrong shape" to which I call attention is the "end-on close-up" which produces a picture as distorted in its way as the old familiar example of the man sitting on the grass with his feet near the camera and his head three feet further away. We know at once that no man has such



THE HIKER BEE BELTON



LA VIE PARISIENNE F. R. DAPPRICH

huge feet as that. But we do not always recognise the similar distortion when an animal is taken close-up and end-on to the camera, with his head exaggerated and his body tapering away to vanishing point.

A close-up of a large creature should, in most cases, be a profile. You cannot get sufficiently good definition if the subject demands 30 to 40 inches depth of field and your lens, by the laws of optics, will give you only four to six inches depth of field. If you must take your subject lying diagonally across your field at a sharp angle you must not be too close—and then 12 feet distance may be better for you than five feet. Not only is it a question of definition but a question of the shape of the animal. I have no use for a picture where all that is sharp is the first three inches of the animal's nostrils, and the rest of him is both woolly in definition and wrong in shape. Yet we see such object lessons all too frequently.

Now let us see how some of the admitted difficulties in zoo photography may be overcome by a photographer, whether keen or casual, regular or occasional, who seeks to get the best picture the circumstances will allow.

First the problem of bars and wire network. Bars are a real problem to the photographer in every zoo, especially those stout bars which cage the big cats. In the London Zoo, and the Zoos at Dublin and Bristol, the keepers can help you if you seek their aid when they are not too busy. They may take you inside the outer barrier and keep the animal at peace while you fire off your plates or films. Often enough they may be able to arrange an animal in the position you choose (if it should be a reasonable one) and keep the animal quiet while you do your best (or worst) with it. They will even allow you to poke your lens between the bars and get a picture free from those gridiron markings of bars which ruin so many efforts at animal photography. If you find it desirable to stand on a chair to get your portrait just right the keeper will generally find a chair from somewhere for you.

In some cases in the London Zoo the keepers are permitted to take visitors into certain cages and enclosures. (Not with fully grown tigers and lions let me add). This is a very valuable privilege to the serious photographer. At quiet times they may even bring out into the open animals and birds that can be trusted (not really dangerous ones, of course). All this makes for easier and better photography and gets rid of the problem of bars and shadows of bars. But don't ask

for these privileges at feeding time, or when the keeper is obviously busy with his duties.

With animals that are highly strung and dangerous, however, the most that can be expected in London Zoo, and then only when conditions are favourable, is that the keeper will take you in behind the outer barrier so that you can poke your lens through the bars and get your subject in the best possible placing that the conditions permit.

The worst way to dodge those iron bars in any zoo is to leap over the barrier and take a chance shot. Any photographer who does that deserves all that he gets from the animals! It has to be remembered that the big cats don't attack with their jaws but with their paws, and those paws may reach out through the bars for about two feet six inches—enough to scalp you if their strike gets home! It is not the animal which the barrier-jumper is watching that generally does the mischief; the danger may come from the other animal, the one which is watching him. Those bars are put there to make the zoo safe for democracy, and every photographer (and every other visitor) ought to respect the fact, for the sake of his own skin as well as from the fact that very few of those tip-and-run snapshots are worth the trouble and risk.

The most valuable help a keeper can give you is not merely to enable you to avoid the bars but to get the animal where you want it—that is at a reasonably good spot for your efforts at portraiture and in a lighting that is favourable for your purposes. Half the secret of good animal photography is to get your animal in the right position in a favourable lighting, and very few photographers know the animals and birds well enough to be able to achieve that by themselves.

Frequently a few offerings of something eatable, or something harmless which will attract an animal's curiosity, will help you, especially in the case of monkeys and birds. A carefully calculated throw of a piece of carrot or a few sticks of macaroni or a fig may get a monkey to move into the position you have chosen for it; the rattling of a bunch of keys will in other cases cause a creature to turn towards you (some animals, by the way, are infuriated at the sound of keys). But don't attempt to feed animals where notices prohibiting their feeding are exhibited—there is always a good sound reason in the animal's own interest for that notice. And don't give them anything harmful, such as a looking glass (how many monkeys, I wonder, are injured by broken mirrors or penknives or tins in a year?). These little dodges are useful when the animal is behind wires, and you can get close to the wires. That brings

me to another point which quite unnecessarily discourages many photographers—the question of wire netting as an obstacle.

Stout bars, especially when you are compelled to stand right away from them, are a difficulty; wire netting, if you can stand near to it, is not. Press your lens close against the wires and they will not show in your picture—they dissolve right out of the way, as a glimpse of the focussing screen will reveal. I thought this fact, so often reiterated, was well-known; yet time after time I meet experienced photographers who are not yet aware of this helpful fact. There is just one snag. Sometimes the sunlight will catch the wires, especially when you stand in a contra-light position, and will then deflect a flare of unwanted light into your camera and give a sort of general fog over the picture. But unless the sunlight happens to strike the wires at certain angles you can get pictures without the wires showing at all or even having any disadvantageous effect on the eventual picture—*if you hold your lens close to the wires.* Some of my own best pictures have been secured in this way and no trace of the wires has been visible to, or even suspected by, those who have studied the enlargements or slides from the negatives.

Some hopeful enthusiasts seek to "control" the out-of-focus images of bars out of their pictures afterwards, but the break in the rendering of the texture of the animals or birds shows afterwards, for all with eyes to see.

Most of what I have said about zoo animals applies to domestic and farm animals as well. Not everyone wants to undertake any zoo photography, but sooner or later most amateur photographers have a shot at animal photography of some kind, and therefore I hope that these notes, the result of many years of close observation, will be of some interest to others as well as zoo workers.

One word about apparatus. The reflex is the ideal camera for animal photography, just as the Goerz-Anschütz type is the ideal instrument for the high-speed worker. I have found the film-pack an invaluable help in zoo photography, because you can be ready for a second exposure on a tricky subject so quickly; and that, without your movements disturbing the composure of a highly-strung creature. Now that Kodak have given us their Verichrome filmpacks (wonderful stuff Verichrome!) and Agfa and Zeiss Ikon and Gevaert and Hauff have given us high-speed filmpacks, they have made things easier for us; while the Ilford Soft-Gradation

"pan" plate and, the Agfa Isochrom plate are among other valuable materials now available for our most difficult subjects.

But to me the most generally valuable new help is the modern fixed-separation telephoto anastigmat, such as the "Dallon," which I use with increasing satisfaction on a 5 × 4 reflex. I started with an 11-inch Dallon and proceeded to a 12-inch with a new camera, but the best results of all, including my pet negatives of the last two years, are the products of a 17-inch Dallon. A 17-inch tele-anastigmat yields negatives with beautiful drawing and portrait-studio quality, and if the definition is good enough (as it is) for my 5 × 4 negatives to be enlarged up to 45 by 35 inches, it is good enough for me! A photographer of animals is incompletely equipped if he does not possess a modern telephoto lens.

He is also incompletely equipped unless his lens has a hood of sensible length, so that he may take against-the-light pictures whenever desirable.

I come back, at the end of these notes, to the point which I would urge more than any other on those who take up animal photography, and that is:—Aim at portraiture. A real portrait should be distinctive of an animal or bird. No two eagles are alike, and if I get a "portrait" of one and cannot identify it straight away, I know that I have pressed my trigger at the wrong moment and that the picture is a failure as a portrait. A real portrait shows the personality of the creature, and a portrait which does not show that "personality" is not a success. The rules by which we judge animal portraiture should be the same as those by which we judge the portraiture of men, women and children. We may be told that it is not necessary to be so fastidious in animal photography. Perhaps it is not, but the only standard worth having is a high one, and anyway a high standard is as necessary in animal work as in pictorial landscape photography, about which enough has been written and spoken to carpet a county with proof sheets. Besides, animal pictures have an educational value, and it is therefore best to be accurate.

THE NEW ROLL-FILM PHOTOGRAPHY

By T. L. J. BENTLEY, B.Sc.

Since the introduction of the daylight-loading of roll-film by the Eastman Kodak Company some forty years ago, there has been no more important movement in roll-film photography than we are witnessing to-day. Hitherto roll-film photography has progressed on the basis of its extreme facility and efficiency within its limits. From the standpoint of the more serious amateur those limitations have been the very small choice of roll-film materials and the difficulties of focussing in the absence of a ground glass screen. But to-day even these drawbacks have vanished, and new types of film cameras and new types of films have given modern roll-film photography a far wider scope than was enjoyed even a decade ago.

In this period the use of film in one form or another has extended into all branches of professional and technical photography, insomuch that the manufacture of sensitive film has become one of the world's leading industries. The progress which this industry has achieved in recent years has been of great importance to roll-film photography. First in the introduction of new and better types of sensitive films, and secondly by stimulating the design of new types of cameras made possible by these better films, in particular very small, highly developed cameras using short strips of cinema negative-film for still pictures. In turn, these miniature cameras, which call for very special qualities in the films used in them, have encouraged film manufacturers to search for new emulsions which would give still finer detail. Films of this sort, first produced to give images of postage-stamp size suitable in their perfect quality for unusually high degrees of enlargement, have later become available for use with roll-film cameras in general. Progress in these several directions has brought about the result that to-day almost any amateur, however particular his requirements or specialised his aims, can obtain photographic film for his purposes, and cameras as convenient as efficient. High-speed action pictures and pictorial studies, or technical work depending for their success on perfect colour rendering, have alike been made possible

to the owner of a roll-film camera, and many of the more difficult tasks of photography have been made much simpler and greatly cheapened by new types of equipment for film photography.

At this time of sudden expansion in roll-film photography it seems worth while to take a look at the rapid steps of recent progress. Without overlooking the case of the camera-user who has no interest apart from the simplest snapshotting, we must give special consideration to the more ambitious amateur who either pursues some special purpose in his photography or expects his camera to deal creditably with a very varied assortment of subjects.

Modern Films for Speed and Colour.

Of chief importance amongst recent advances are the improved types of roll-film now on the market.

The first, and in some respects the greatest step forward, was the introduction of panchromatic roll-films and film packs nearly four years ago. First the Imperial "Impan" film, and soon after, the Ilford Panchromatic film, gave roll-film users the advantage of magnificent tone values and easy colour correction, which are best given with a film sensitive to all the colours of the spectrum. This triumph of the British photographic industry was the first great advance in roll-film manufacture for many a long day. But apart from these new panchro products, the film user had only the medium speed, slightly orthochromatic film—in a score or so of brands, all much of a muchness. So the position remained until a year or so ago, when such notable introductions as the Hauff Ultra, the Agfa Isochrom and the Kodak Verichrome completely changed the position. The film-user for the first time enjoyed a real diversity of film types, ample for all practical purposes.

The new films in general give as their first advantage a considerably increased speed. Until the new "ultra-fast" films came on the market all roll-films were recognised as being of roughly equal speed corresponding with "medium-speed" plates. The recently introduced "ultra-fast" films may all safely be taken as being fully double this speed. For the owner of a box camera this means that instead of using his camera for holiday snapshots and then putting it by till the summer months come again, he is able to use his camera all the year round when conditions are favourable. A good pocket film camera in the same way is converted, merely by the act of loading it with one of the new films, into an instrument which rivals the Press camera for many interesting

branches of action photography. So long as the subject comes within the scope of a diaphragm shutter the film camera is nowadays capable of dealing with sports photography. As an example I include amongst the illustrations a cycle-racing picture which I took in London, late on a late-September afternoon, under misty sunlight. The subject—racing cyclists sprinting at nearly 30 m.p.h.—is definitely more difficult than faster motor-racing subjects, owing to the rapid

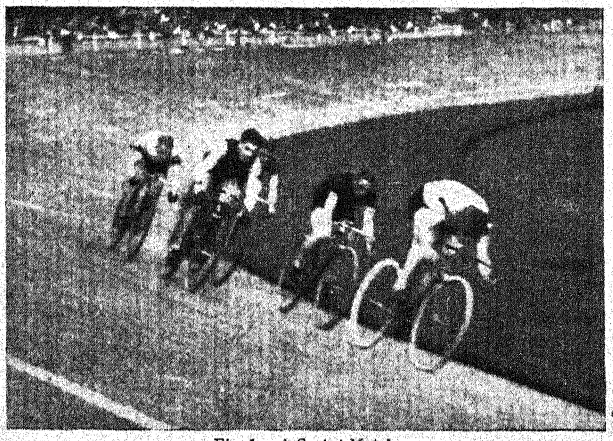


Fig. 1. A Sprint Match.

movement of the legs and the consequent impossibility of giving a longer exposure by swinging the camera. This example, taken on Isochrom film with a 3 × 2-in. camera, with a 1/300th second exposure (Compur) at *f*/4.5, shows that the modern small film-camera and ultra-fast film will give really successful results even in exacting forms of action photography. The reproduction (fig. 1) itself represents an enlargement of nearly four diameters from a small part of the film.

In addition to this marked increase in speed, most of the new films have been made much more sensitive to green and yellow rays. This colour-sensitiveness is of great advantage in many ways, even to the snapshot maker who has no knowledge of questions of colour rendering or the use of colour filters. He gets an advantage whenever the trigger is pressed early or late in the day, or at any time in the shorter days of the year : at such times the colour sensitiveness of the film helps to take

care of the exposure by ensuring a sufficient light-action in spite of the yellowish nature of the light. Almost every negative taken on one of the new films is bound to show more delicate half-tone gradations, more nicely gradated skies, a more pleasing play of light and shade, and a better suggestion of colour values than would a negative on an ordinary film. There is a much higher prospect of success in night photography or indoor pictures by artificial light. Lastly, the amateur who is keen enough on fine photographic tones to use a colour filter on the lens has far greater ease than with his ordinary films in obtaining beautifully graduated negatives of portrait or landscape subjects with snapshot exposures. Even the palest yellow light-filter is sufficient to bring out an excellent colour rendering, sufficient to record cloud forms in their full beauty, and the exposure necessary with the new film through the light-filter will be no longer than ordinary film would need without a filter.

Non-halation Roll-Films.

The fact that roll-films are coated on a very thin celluloid base has always meant that their users have been very largely spared the troubles of halation with which the plate-user is only too familiar. The spread of light round the edges of any high-light—round tree trunks or roofs seen against the sky, or round the sides of a window—is a defect which is liable to occur more or less in all parts of an image, thus spoiling definition, degrading the tones and ruining the quality of the image. With roll films the trouble from this source has been minimised by the thinness of the base, and



Fig. 3. A Black Forest Town Hall.

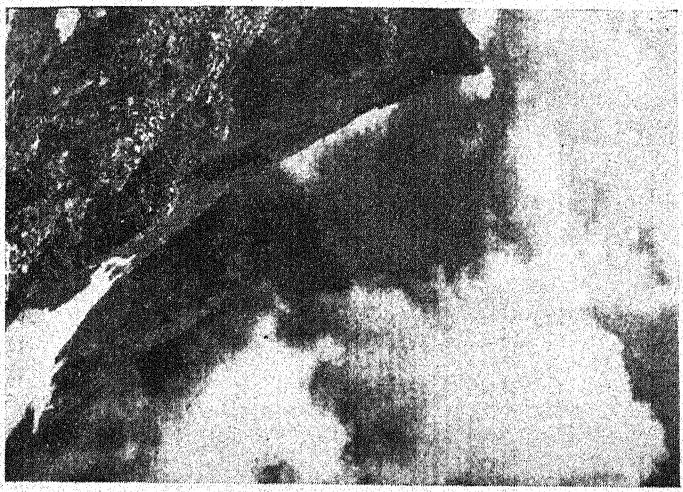


Fig. 2. Mountains of Tyrol.

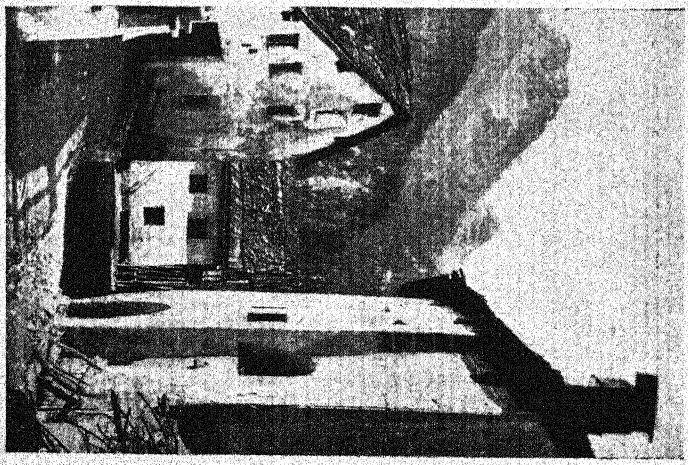


Fig. 4. An Engadine Village.

only in cases of specially difficult character has halation become a real difficulty to contend with.

However, the vogue of ultra-small film cameras and of sub-standard cine-cameras in particular, has proved a new factor. Without an image so perfect in quality as to give very pleasing tones when greatly enlarged, cameras such as these fail to give full satisfaction. Only a film capable of giving the utmost crispness of image is good enough. In other words, only a film which has been provided with a coating that prevents halation. Consequently owing to the demands of miniature cameras the almost halation-free film of yesterday has been followed, inevitably, by the fully halation-proof film of to-day, with advantage to users of roll-film of whatever size.

The fact that halation does not occur with these new films has an important bearing on another quality in which several of the new films show great superiority to ordinary films, namely, in their greater latitude of exposure. It is a matter of long experience amongst roll-film users that negatives which have been very fully exposed may be quite printable, but that the prints when made are so dull and muzzy as to be scarcely worth having. The real fault has been, not that the emulsion was lacking in latitude as regards the range of silver densities, but that with over-exposure halation has played havoc with the quality of the image before the available latitude of the emulsion was exhausted. In the non-halation films this loss of quality is prevented, so that prints from much over-exposed negatives still show a sparkling quality. The suppression of halation means that whatever latitude is present can be usefully employed. In addition, the actual scale of these new emulsions has been extended, so that errors of exposure which would be ruinous with ordinary films will still give quite satisfactory negatives on the new films.

A good example of this quality—though the half-tone process may not do it full justice—is shown in fig. 5, "Buckingham Palace by Floodlight." This negative, which was given 12 seconds at $f/4{\cdot}5$ on Verichrome film, received enough exposure to give good detail in the masonry of the Queen Victoria Memorial on the left, so that the intensely bright areas of the Palace behind must have had a very full exposure indeed. That such fine detail and tone gradations are preserved in these parts of the picture speaks very highly indeed for the non-halation quality of this film.

Still another excellent feature is that the new emulsion methods which have led to the new films have given very high

speed without the coarse granularity usually associated with very fast emulsions.

Characteristics of the New Films.

The new films now on the market in this country need to be grouped in three classes, for the guidance of the practical worker, from the point of view of their behaviour in development. Certain of them are quick developing and very easily give harsh contrasts: others are very slow developing, and the difficulty is rather that of getting enough vigour. The Imperial and Ilford Panchromatic films, on the other hand, are of normal, intermediate type. Roll-film in the past has usually been made with a soft-working emulsion, and this property may be said to have been retained with the greater number of the new faster films, e.g., Kodak Verichrome, Gevaert Express, Zeiss Ikon Ortho-Ultra. On the other hand, Agfa Isochrom, Hauff Ultra and Perutz Fine-Grain very easily give considerable vigour in development. The difference needs to be borne in mind by the amateur who develops his own exposures. What the D. & P. firms do about it is more than I can say.

Of these, the two panchromatic films are only slightly faster than ordinary films: the others are all "ultra-fast" varieties. The Agfa Isochrom, Kodak Verichrome and Zeiss Ikon Ortho-Ultra are all provided with a red dye backing, which dissolves away very readily in alkaline developer: the Gevaert Express and others carry a dark-coloured sub-coating between emulsion and celluloid, which clears under the action of an acid fixing bath.

In addition to the foregoing films, which are available in sizes for all types of film cameras, there are a number of others obtainable as yet only in the special spooling for Leica cameras. Notable amongst these are the Kodak Super-Sensitive Panchromatic film, a very fast film of exceedingly high panchromatic sensitiveness; the slower Kodak Panchromatic; the Agfa Special Fine-Grain, a fine-grain vigorous film, with brown sub-coating; the Gevaert Special film, another brilliant, fine-grain film, and the Mimosa Extrema, a very fast, vigorous film with a brown anti-halation layer.

The New Roll-Film Cameras.

The attractiveness of roll-film hand-camera photography has always been its freedom from time-wasting manipulation. No fiddling with loose plate-holders; no troubling to focus the picture on the ground glass. And if the system of focussing by judging distances and setting the camera accordingly is

not everything it should be as regards precision, the vast majority of the photographing public have shown that they preferred it to any other. The faster new films, by allowing the use of a smaller lens-stop, have, of course, added to the certainty of focussing by scale, and in the meantime, camera makers have applied their skill to simplify matters by designing and making cameras of ultra-small size which in large measure remove the remaining drawbacks of the scale-focussing system, whilst affording the boon of extreme portability and "pocketability."

There can be no doubt that this new movement in film camera design was inaugurated by the Leica, made entirely of metal, and taking 35 pictures, each 1 × 1½ ins., on a length of film of the standard cinema width (35 mm.). One ingenious feature of the Leica is that the film is wound on by the correct amount and the focal-plane shutter is re-set simultaneously by the turn of a single knob, thus preventing either double exposures or the missing of exposures. A further feature is its adaptability for the attachment of extra lenses, *e.g.* telephotos, light-filters, etc., so that the little instrument is not merely one for the amateur who would cut out all complications, but may be fitted with supplementary equipment by those who have their eye on using it for one special branch of work or another. Its focal-plane shutter qualifies it for high-speed subjects.

Vest-Pocket Miniatures.

Other makers have not been long in embodying the convenience of the ultra-small camera in other forms. The Zeiss Ikon first adopted the principle that a vest-pocket spool, normally taking eight pictures, would equally well accommodate sixteen half-size pictures, each 1⅝ × 1¼ ins. From this idea evolved the Kolibri, a camera in which focus on "infinity" is provided by a tubular extension to "infinity," whilst a helical movement gives focus for near distances. This arrangement gives extreme compactness and, at the same time, great ease in loading film. For popular purposes the Kolibri principle is all that can be desired, and with the economy of sixteen negatives for a shilling to recommend it, the Kolibri speedily set a new fashion. It has been followed by a succession of 3 × 4 cm. cameras, all using the vest-pocket spool, and differing chiefly in mode of extension, equipment and quality of finish. The best examples include two excellent cameras, the Mentor "Dreivier" and the Nagel "Rolloroy"; less expensive patterns are the Fotet, the Zodelette, the Certo "Dolly," and the Plaubel "Makinette." This

pattern has lent itself to the production of less expensive models fitted with cheaper lenses and shutters; notable instances are the Zeiss-Ikon 3 × 4 cm. Ikonta, the cheaper Kolibri and the Nagel Ranca.

Focus and Exposure with Miniature Cameras.

These new miniature cameras are "in form and moving so express and admirable" that the amateur may perhaps be excused if he jumps to the conclusion that their use relieves him altogether of the necessity for care and thought in his manipulation. It will save disappointment if a word of caution be uttered in respect to the two matters concerned, in obtaining the greatest success, viz., focus and exposure. As regards the first, it is certainly true that the little lenses on these cameras give great depth of focus at full aperture, and so can often give a result with a light which would be too poor for a larger camera with its slower lens. But nevertheless, the little negatives have to be enlarged more, and for the finest results, as regards crisp sharp enlargements, it is just as important to get the utmost sharpness in the negatives as when using a larger camera. Neglect in this respect will lead to disappointment, and the camera will be blamed because of omission to use the adjustment which the maker is at pains to provide.

The same applies to exposure. Since they are to be enlarged 4 or 5 diameters, these ultra-small small negatives are the ones of all others which require to be of ideal quality, that is thin, clear and brilliant; first because over-exposure tends to "muzz" the definition and also because the enlarging becomes a slow and laborious job if negatives are dense from excessive exposure and development. In short, take as much care—nay, more—in ascertaining the exposure as you would with a cheap box camera if you would get the greatest number of easily enlargeable negatives from each spool of film.

Cameras for Two-Size Negatives.

Another principle has lately been exploited by several makers, namely the use of a $3\frac{1}{4} \times 2\frac{1}{4}$-in. film for making sixteen half-size pictures. In this way sixteen "vest-pocket" negatives, in effect, are obtained on a shilling film, whereas the real vest-pocket film only gives eight negatives for the shilling. This idea had been utilised some years before in the Ensign-Cupid, but evidently before its time. It is revived in the new Dallmeyer "Dual," a beautifully made camera with lazy-tongs extension and complete enclosure of the lens

and shutter when unextended. Taking an eight exposure $3\frac{1}{4} \times 2\frac{1}{4}$-in. film it gives sixteen pictures of size $1\frac{5}{8} \times 2\frac{1}{4}$ ins.

The Voigtlander "Inos" is a $3\frac{1}{4} \times 2\frac{1}{4}$-in. camera which can be used for taking either whole-size or half-size negatives. A detachable metal mask in front of the film makes the alteration, and two ruby windows fitted in the camera back allow the winding of the film to be noted. The "vest-pocket" negatives obtained in this case are, of course, not identical with ordinary vest-pocket negatives. They are narrow-angle negatives taken with a lens of comparatively long focus. For portraits and many other subjects, this is all to the good.

Reflex Cameras for Roll-Film.

Considering that the reflex camera provides the readiest means of focussing on a ground glass when using roll-film, it is rather strange that in the past makers should have done comparatively little in supplying reflexes designed to carry the roll-film spools. However, there are now a number of roll-film reflex models to choose from. In the Ensign series, the focal-plane patterns, and in particular the Ensign Tropical roll-film reflex, are emphatically for the roll-film user who requires a camera for fast sports work. Of stout and compact build, they are amongst the most serviceable of film cameras.

The Rolleiflex, one of the masterpieces of recent camera design, is of different pattern. In place of the swinging mirror, it adopts a twin-lens construction in which a separate view-finding lens and fixed mirror throw an image that remains in view on the focussing screen all the time. Further, the usual focal-plane shutter of the reflex is replaced by a Compur, giving the slow snapshot exposures not available in focal-plane reflexes. Thus the Rolleiflex combines the facilities of the reflex with that of the real miniature camera, and is a specially delightful instrument for the amateur interested in portraiture or animal studies, or for any close-range subjects such as that of fig. 6, in which the opportunity is short and has to be seized instantly. It is made as a $2\frac{1}{4} \times 2\frac{1}{4}$-in. model and also in 4×4 cm. size—the small Rolleiflex—giving twelve 4×4 cm. pictures on an eight-exposure vest-pocket film. The film winding in the latter is cleverly adjusted by means of a hand-crank winder that does not depend on the film numbering.

The twin lens construction is also adopted for another little gem of a roll-film camera, the Pilot, which like the Rolleiflex, also comes in the class of the miniature cameras. The Pilot takes 3×4 cm. pictures and its pair of lenses and also the little

hood for viewing the picture in the upper camera are instantly brought into the working position by pressure on a button. The ease of setting the focussing scale on any distance up to 3 ft. is a further feature, and so is the lever mechanism which moves on the film for the precise distance required. The hood of the Pilot is fitted with a magnifier which enables the least expert to obtain critical focus in circumstances when this visual method is preferable to the use of the focussing scale.



Fig. 6. An Interlude "on the Prom."

The only other example of a roll-film reflex is the clever British design, the Duoflex. The novel features of this are the very simply operated focal-plane shutter formed by two swinging metal flaps, and a vertical focussing screen which can either be viewed directly with the camera at eye level or by reflection at waist level. Taking $3\frac{1}{4} \times 2\frac{1}{4}$-in. spools, the Duoflex is a very practical, convenient and compact reflex.

Rising Fronts and Rising Finders.

From what has already been said, it will have been gathered that roll-film cameras have been evolved on the principle of giving the user the least degree of latitude; that is to say, the least opportunity to make mistakes. Hence the lesser provision of "movements" which, stage by stage, have found their way from the plate stand camera to the plate hand-camera. It may be expected that with the advent of the new films, users of film cameras—or at any rate, the more expert among them—will call for more generous treatment in this respect—of a kind which hitherto has been accorded in the de luxe models such as N. & G. Sibyl, Adams Verto and 3A Kodak, and, to a lesser degree, in a few others. The chief of these movements is the rising front, a facility which is sorely missed by the serious worker in photographing archi-

tectural subjects and scenes in towns. Here a rising-front movement—and plenty of it—is essential for avoiding "drunken" lines in one's photographs, and what is of almost equal importance is a linkage of some kind between the lenses of camera and finder, so that the latter shows the picture which is actually obtained when the camera lens is raised. The ways in which this is done in the Verto and Sibyl leave nothing to be desired as regards convenience and accuracy. Figs. 4 and 7 are examples of subjects which could not well be taken without this kind of mechanical assistance: perhaps they will also suggest how varied are the occasions when the user of such a camera has reason to value these refinements.

Roll-Film Cameras with Focussers.

To return to the question of making sure of sharp focus, especially on near objects, I should refer to several cameras which embody means for this purpose. The well-proved No. 3A Kodak Special, for postcard roll-film, has an optical range finder built into the base of the lens front and linked with the focussing; in this device the subject is seen divided into three strips horizontally, so that all objects except those on which the lens is focussed appear disjointed. All that the user has to do is to adjust the focussing until the chief object joins up correctly in all three bands of the range-finder; the focus is then critically correct.

A similar method is employed, very ingeniously indeed, in the Agfa Standard focussing film camera. In this the range-finder is mounted on the side of the camera body in the form of a wafer-like casing. The optical element inside is connected by chain to the camera front and, as the focus is altered, vertical lines in the finder appear to shift sideways. When, for example, the vertical edge of a column is seen to lie exactly in line with the actual edge viewed directly just above the finder, the lens is exactly focussed on that column.

A totally different solution of the problem is provided in the Enolde camera. Here a tubular attachment fits on the side of the camera and has at the front end a lens which is connected to the lens front of the camera and moves simultaneously with the camera lens in focussing. The tube contains a miniature ground-glass on which falls an image duplicating the small central area of the image in the focal plane of the camera. Hence critical focussing is obtained by setting the focussing so that the image in the focussing tube is seen to be critically sharp when magnified by the eye-piece. This device serves at the same time as a direct-vision finder, for the object seen in the tube is located centrally on the film.

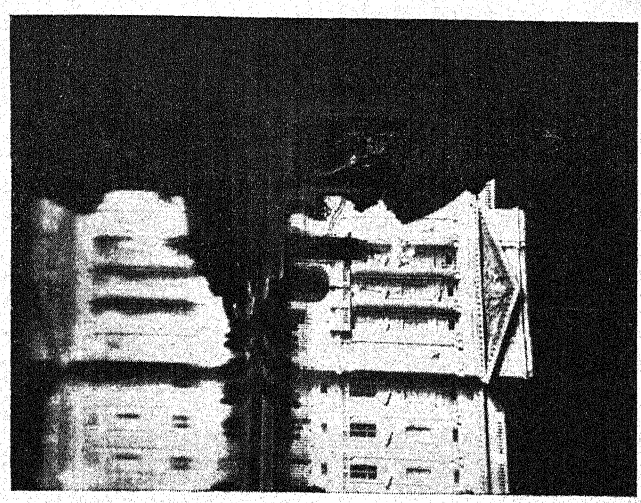


Fig. 5. Buckingham Palace by Floodlight.



Fig. 7. A Foaming Cascade.

In this connection may be mentioned a roll-film camera (for full focussing of the picture on a ground glass screen) which I have never seen. This is the Cruver-Peters Palko, in which the two spools can be drawn together into a closed compartment, thus uncovering a focussing screen

Roll-Film Backs for Plate Cameras.

Before leaving the question of apparatus reference should be made to the roll-holder by which ordinary spools may be exposed in a plate camera. This accessory fits almost all plate cameras made for use with single metal slides. As the film does not take its normal straight track when used in this holder the series of images is displaced a little towards the rear end of the film, and with many films it will happen that the last exposure is partly lost from the end of the film. This can be overcome either by adhering to a make of film which does correctly accommodate the last image, or by making a practice of stopping the winding some distance before the numeral appears in the window. Every film is marked in some way with indications to show when a numeral is approaching—dots, arrows or the like—and it is simple to choose one such mark each time as the stop in winding.

Distance Meters and Light Filters.

Where the focussing problem is not solved in some other way, an optical distance meter, such as the Leitz, Zeiss Ikon, Heyde or the Dist, is a desirable luxury : it is only less important than the exposure meter and the light-filter. The latter is certainly indispensable. The new, highly orthochromatic films respond very much more to the action of ortho filters than do the old, ordinary films. Even a pale yellow filter, which would not noticeably improve the tones on an ordinary film, gives a very satisfactory improvement in the rendering of skies and landscapes. For all ordinary purposes the lightest yellow filter will give all the correction necessary, and the exposure factor will be low, only 2 or 3 as against the 5 to 8 with the old film.

Pointers in Development.

The colour-sensitiveness which makes this possible also affects the developing process. Greater caution is necessary in exposing the film to the dark-room safelight. It is advisable either to work in total darkness, regulating the development by time and temperature ; or to work in darkness until development, judged by time, is almost complete, switching on the safelight only for a final examination ; or to adopt a routine of desensitising in development ; or to use a daylight developing

tank. Daylight tanks for roll-films present sources of difficulty, and only experience with a particular type of tank will show whether its use is really satisfactory. Tanks in which the backing paper is left in contact with the film are liable to have an irregular matting effect on the gelatine-coated back of the film and, with certain films, may cause very serious mottled stains of black dye from the backing paper, especially with a pyro developer. In tanks which strip the paper from the film these disadvantages are avoided, and the chief question is whether the means of extending the film in the tank can be relied on to work positively and reliably. The reputation which the Kodak tank enjoys is proof that tank methods can be quite efficient for roll-film development.

In one respect the new films have introduced a new complication into tank development, viz., the necessity for clearing the halation-preventing layer. Films which carry a non-halation backing require free access of the developing solution to both surfaces of the film for the removal of the dye coating. Whether this condition is fulfilled or not depends on the particular type of tank used ; if not, then the film taken from the tank after fixing may have the remaining traces of backing dye removed by passing the film through a weak solution of soda carbonate before the washing. With a film having an anti-halation substratum, clearing depends on the use of an acid fixing bath, which must not, however, be used in the developing tank. In this case it is best to fix first in the tank with plain hypo, and then with the film removed to a glass or porcelain vessel re-fix in acid fixer until the dark substratum has cleared.

However, where dark-room facilities are available there is nothing really better than the old see-saw practice of dish development. An ample quantity of solution of strength to complete development within about 5 minutes, fresh hypo of about 40 per cent. strength and suitable rounded vessels—such as Ensign Easy film developing dishes—and film clips make the handling of lengths of film in see-saw fashion quite convenient.

For all except panchromatic films and a very few of the new extremely orthochromatic films it is possible to use a ruby safelight, such as the Wratten No. 2, without desensitising, if reasonable care is used in protecting the film from needless exposure to the light. After desensitising, an orange safelight (Wratten No. 1) may safely be used for following the development, though it should not be switched on until development has begun.

The see-saw development of films, involving the exposure of film impregnated with developer to the air for the greater part of the time of development, means the possible occurrence of "aerial fogging"—a general veiling of the emulsion owing to oxidation of the developer. This effect, however, occurs only with developers containing hydroquinone, and may be prevented with these by the presence of a minute proportion (even 1 part in a million) of pinacryptol green in the developer. Alternatively, a metol-adurol mixture, paramino-phenol developers, or proprietary developers such as Azol, Rytol or Rodinal are excellent for see-saw roll-film development.

Fine-Grain Developers.

Methods of fine-grain development have come into prominence with the vogue of miniature film negatives. The special developers advocated by the different makers of fine-grain film for use with their products certainly are of value in minimising granularity, but their greater importance usually lies in correcting the excessive tendency of the fine-grain films to build up contrast. Negatives of altogether softer quality are produced by these special formulæ. Consequently their use is to be recommended for these exceptional films exclusively. Many of the ultra-fast films are soft in quality, almost to a fault, and a normal vigorous developer is desirable. If any compromise is made in the effort to obtain negatives for the maximum enlargement the well-known Wellington Borax-M.Q. developer is the best choice. But, apart from the special purposes of ultra-small cameras, trouble from granularity need not be anticipated even with the fastest of the new films.

REAL CONTROL IN DEVELOPMENT.

By AUGUST KNAPP, F.R.P.S.

If a plate or film is placed in a developer for a short period, say 30 seconds, the emulsion will absorb a certain quantity of developer, and if the plate is now placed quietly into a dish of water the development will proceed so long as any non-exhausted developer remains in the emulsion, approximately about two minutes.

If a plate were subjected to this process three, or perhaps four, times, and portions of it could be fixed and examined after each cycle, it would be found that the relative progress of development of the high-lights and the shadow detail would be very different from that which would have occurred if the plate had been developed for a similar period in the same developer but in the ordinary manner. The water-bath-developed negative will show very much greater development of the shadow detail and half-tones and correspondingly less development of the high-lights than would have occurred under continued development. This can be demonstrated by cutting off and fixing sections of a film and comparing them with a control film which has had continuous development in the same developer.

It is possible by this method completely to develop every atom of "light-struck" silver in a plate without fear of producing undesirable density in the high-lights, a result which, it is believed, has always been regarded as "impossible."

There are two definite and distinct factors which contribute to the production of this result, namely, (1) when the plate, being charged with developer, is placed in the water bath, the developer which is contained in the emulsion becomes quickly exhausted in the high-light area of the plate where it has much work to do, but development continues for a much longer period in the less exposed portions of the plate, where the developer has comparatively little work to do. (2) The by-products of development are almost completely discharged from the emulsion whilst the plate is in the water-bath, and the exhausted developer is replaced with fresh, unused material.

Because of this ability to develop all the light-struck silver in the shadow detail area, it becomes possible to give very much shorter exposures than were formerly necessary, and to use K2 or K3 filters where formerly only a K1 or K1½ was possible. An instance of this was the production of a perfect negative on an Ilford panchromatic plate (H. & D. 400) exposed at six o'clock in the evening on a narrow street subject through a K3 filter for 1/40th of a second with an aperture of *f*/4·5.

A developer made up of water 1 oz., sulphite of soda 11 grs., and amidol 2 grs., gives excellent results with these and other plates and films, the times of immersion in the developer being 40, 50 and 90 seconds, each immersion being followed by at least two minutes in the water-bath. No bromide is necessary, and the developer is practically fog and stain-proof. Developers containing hydroquinone may be regarded as unsuitable for this method, and developers which are rich in alkalies should only be used at low temperatures.

It is important to remember that the plate should on no account be left in the developer longer than 40 or 50 seconds during the first two applications, otherwise the development of the high-lights may progress to a stage which is undesirable

If it is desired to increase the range of densities of any negative developed by this method, the chromium bleacher may be used, followed by re-development with the same amidol developer which was prescribed for the original development. It will be noticed that the intensification will affect only the high-lights of the negative and not the shadow detail.

The temperature of the developer is unimportant, perhaps with the exception of the last immersion in the developer, which in a three-cycle system might range from 80 to 100 seconds.

I am, of course, well aware that transferring to a dish of water a plate in which shadow detail "hangs fire," is an old dodge in development. The method described above is very different, the plate or film being systematically treated in the full-strength developer for a series of short but increasing periods. By its use, under-exposed roll-film, such as occurs in the use of a cheap box camera, gives an exceedingly good account of itself, yielding the quality and tone-values of full exposure.

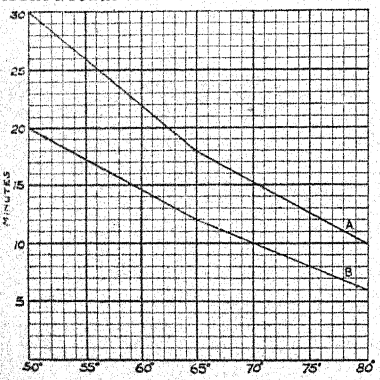
TIME & TEMPERATURE DEVELOPMENT.

By RICHARD B. WILLCOCK.

The increasing tendency towards universal use of high-speed films, and plates which are sensitive to all colours, has made compulsory the adoption of development methods based on sound scientific lines. This transition from tray development by inspection to the more expeditious and altogether superior tank system is due in the first instance to the strict necessity of manipulating panchromatic materials in total darkness. Since no dark-room light is permissible, it follows that, in the absence of visible means of checking progress, some reliable method must be provided of accurately calculating the exact time in which development to a definite density takes place. This is accomplished by making use of the correlative influence of time and temperature on the energy of a developing solution. Thus, in practice, we find that a developer of suitable composition and strength will produce on any one grade of film, or plate, a certain standard of density in a time governed by, and in proportion to, the temperature of the solution. Provided all conditions are identical, such a process may be repeated time after time with complete confidence.

The advantages of tank development should be obvious. On the one hand there is entire freedom from fog, and the assurance of consistency in respect of quality, and printing value. On the other hand, the advantages of clean, and expeditious handling of large quantities of films and plates are enjoyed. Furthermore, there is no preliminary preparation of the developer to consider, the tank being at all times ready for immediate use. The risk of damaging the emulsion surface is entirely eliminated, and speaking of long experience with the Kodak film tank system the writer can definitely assert that employing this, or any other reliable system, it is absolutely unnecessary to soil the fingers with developing solution. Particularly in copying, provided a constant illuminant is used, arbitrary development brings consistent repetition to any desired standard, within easy reach. Even with process films, for line work, which usually require special treatment, a high degree of contrast is obtained without varying the strength or composition of the developer.

The temperature of the developer should be maintained as near as possible to 65° F. With each box of Eastman panchromatic films is included a card which gives the times of development at 50, 65 and 80° F. These data are obtained from actual tests on each batch of emulsion. From these times it is a simple matter to plot a curve which will show at a glance the development times at various temperatures. Such a curve is reproduced in fig. 1. Reference to this shows that the development times throughout the scale are not proportionate. That is, if for the developer " A " the temperature coefficient is assumed as being taken from 80° to 65° (15°) we have a coefficient, or multiple, of 1·8, which if applied to a further 15° (65° to 50°) would give a development time of 32·4 minutes at 50°. Actually 30 minutes at 50° is quoted as being correct by trial. Thus we have two disproportionate coefficients i.e., 80° to 65°=1·8; 65° to 50°=1·6. Disproportionate times also occur in developer " B," and in the Ilford time card for pyro-soda, M.Q., and " Certinal " developers. It is difficult to adduce a reason for these variations other than the supposition that in respect of panchromatic emulsions, density does not build up in proportion to time of development. It may be, however, that a definite time, regardless of temperature, is necessary in order that permeation of the emulsion by the developer may take place. Mees and Sheppard have referred to this fact, also maintaining that, whereas density grows in proportion without bromide, the addition of bromide causes an induction, or retardation period, depending on exposure and bromide concentration.



A. Pyro metol-hydroquinone developer.
B. Fine grain M.Q. borax developer.
Fig. 1.

Whilst it is possible to develop at temperatures varying with that of the dark-room, the constant temperature method is generally regarded as being the most reliable. The latter method is employed by the writer, who makes use of a temperature chamber, consisting of a heavily constructed teak box.

The heaters comprise 2 20-watt carbon filament lamps, controlled by a series-parallel switch which allows the following combinations to be used :—Both lamps full-on ; one lamp full-on ; or both lamps in series, which halves the normal voltage on each lamp. In normal winter weather, both lamps in series maintain a steady temperature of 65° F. if allowed to remain permanently switched on. In hot weather, the lamps are not necessary, the temperature being controlled by a cooling fan. Further variations are easily made by increasing or reducing the wattage of the lamps. The arrangement of this box is shown in fig. 2 and 3. As an alternative an immersion heater may be used, but certain difficulties attend the use of these instruments.

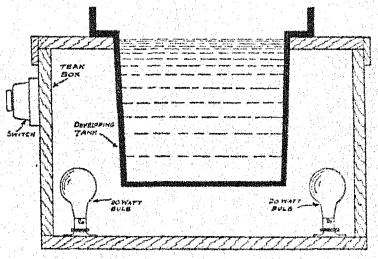


Fig. 2. Tank Heating Box.

Fig. 3, shows the disposition of the writer's tank equipment. Behind the temperature box will be seen the time card supplied with the films, the time curve, and a record of the dates on which the developer was renewed. Also behind the tank hangs a thermometer, which is a decided asset in adjusting the heat of the chamber relative to the temperature of the dark-room.

With properly constituted developers tank fog rarely occurs. It is, however, induced under certain circumstances by hydroquinone, and more particularly by the use of overworked and stale solutions. Aerial fog is not associated with tank development, since it is not at any time necessary to remove the films or plates during development. Pinakryptol green, mercuric cyanide, and certain other substances are credited with the power of reducing tank fog, but complications are likely to arise from their use, and generally speaking they are best avoided. It has been found that pyro, in combination with metol and hydroquinone, entirely eliminates tank fog, providing a developer of good-keeping quality, and in every way suitable for tank development. Entirely without bias other than an appreciation of its good qualities, the pyro-M.Q. developer specified by Kodak is recommended. It is :—

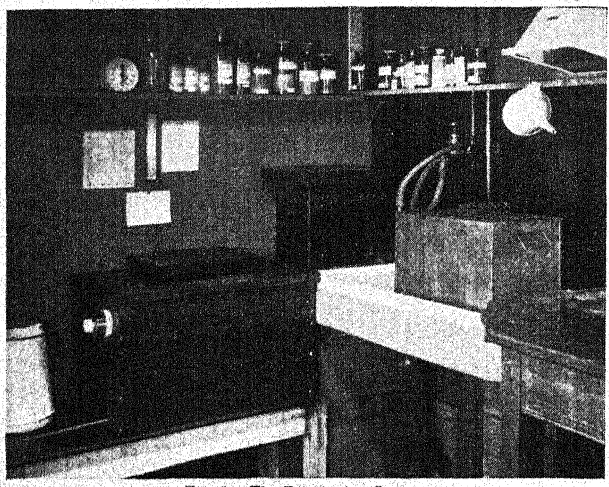


Fig. 3. The Developing Outnt.

Elon (or metol)	60 grs.	1·7 gms.
Sodium sulphite (dry) ...	8 ozs.	100 gms.
Hydroquinone	240 grs.	6·8 gms.
Pyro	240 grs.	6·8 gms.
Sodium carbonate (dry) ...	3¼ ozs.	40·6 gms.
Potass. bromide	30 grs.	0·9 gm.
Water to	80 ozs.	1,000 c.c.s.

For use take 1 part of the above to 4 parts of water. At 65° F. Eastman panchromatic films average 18 minutes for complete development. A supply of the above concentrated solution *without bromide* should be kept at hand for the purpose of maintaining the level of the developer in the tank.

Although glycin has been condemned, it is capable of producing negatives of exceptionally fine quality. It has been stated elsewhere that one of the causes of failure associated with glycin tank development is due to the use of Hübl paste, which, owing to the amount of sulphite contained, produces fog. For those seeking a reliable glycin formula, the following by Hauff can be thoroughly recommended.

Water (hot)	7 ozs.	1,000 c.c.s.
Soda sulphite (cryst.) ...	25 grs.	8·1 gms.
Soda carbonate (cryst) ...	375 grs.	122 gms.
Glycin	25 grs.	8·1 gms.
Potass bromide	0·15 gr.	0·5 gm.

When the above are dissolved, add cold water to make 35 ozs. (5,000 c.c.s.) of developer. This is used at a temperature of 55° F. the normal time of development being 30 minutes.

The following Kodak fine-grain developer is eminently suitable for tank development, and is recommended for Eastman supersensitive panchromatic films.

Elon (or metol)	116 grs.	13·2 gms.
Sodium sulphite (dry) ...	1¾ ozs.	662 gms.
Hydroquinone	290 grs.	33·0 gms.
Borax	116 grs.	13·2 gms.
Water to make	1 gall.	8,000 c.c.s.

This is a clean working developer, the developing times of which are given in fig. 1.

An acid-hardening-fixing bath may be used in conjunction with any of the developers mentioned, but for all-round reliability the bath made up with hypo and potass meta-bisulphite cannot be improved on.

In tank development the sequence of operations is simple. First take the temperature of the developer; then calculate the required time. Make sure that dark slides, and plate rack, or in the case of films, the loading fixture and hangers, are conveniently placed; then switch off the light. When dealing with films, place each one in the tank as soon as it is loaded into the hanger, setting the clock immediately the first film has been immersed in the developer. When development is complete, remove the films in the same order, rinse well, and place without delay in the fixing bath. In the case of plates, however, it is necessary to employ the same frame for one, or a number, so that in dealing with a quantity, the series of operations prior to placing them into the tank should be carried out as quickly as possible, since the danger of fog from extraneous white light is always present. Success depends to a large extent on cleanliness, therefore it is essential that solutions which are required to stand for any length of time are not in any way contaminated. Pyro-metol-hydroquinone, though possessed of good keeping qualities, must be changed every week whether it is used or not. With each change of developer and of fixing solution, the tanks must be thoroughly cleaned, making sure that the sludge which collects at the bottom of the tanks is entirely removed.

With intelligent use, tank development rarely gives rise to development marks or air bubbles. Such troubles when they occur are invariably caused by carelessness or haste. When placing films or plates in the tank, slowly lower them into the solution, and move them about several times during development. Do not use the tank immediately after it has

been filled with developer; allow sufficient time for any air bubbles to rise to the surface. Scum, which at times appears on the surface of the film after fixing or washing, is probably caused by impurities in the water supply; such markings generally yield to treatment in a 1 per cent. solution of hydrochloric acid.

Briefly summing up the advantages of time and temperature methods, it is found that reliable working is entirely dependent on a few important, but easily observed rules:—The time should always bear the correct relation to temperature; and the character, component values and the degree of dilution of the developer should not be allowed to vary. Provided strict attention is given to these details, over and under-development are impossible; thus is made simple the production of negatives to a definite printing value.

There is nothing high-brow about systematic tank development; once confidence is gained in its efficiency, much of the drudgery and uncertainty of dark-room work will depart. As a matter of interest it is mentioned that the photograph of the writer's dark-room was made on portrait panchromatic film, the illumination consisting of 2 150-watt gas-filled lamps. Development was carried out in total darkness using the pyro-M.Q. developer already referred to.

THE ILLUSTRATIONS.

The following is a list of the reproductions arranged in the order in which they appear in the book, together with indications of their placing.

BEE BELTON (London).—The Hiker (*facing p.* 170).

F. R. DAPPRICH (Los Angeles).—La Vie Parisienne (*facing p.* 171).

The following are placed between pages 202 *and* 203.

JAS. C. H. BALMAIN (North Berwick).—The Diver.

YVONNE GREGORY (London).—A Dancer.

J. E. SAUNDERS (London).—The Chimpanzee.

HUGO ERFURTH (Dresden).—Portrait.

J. E. SAUNDERS (London).—Rex the Leopard.

W. MORTENSEN (Taguna Beach).—Myrdith Monaghan.

WALDEN HAMMOND (Leamington Spa).—Etude de Nu.

MARCUS ADAMS (London).—Lady Honor Vaughan.

EM. SOUGEZ (Paris).—The Window Pane.

W. A. BLANCHARD (Great Crosby).—A Dancer.

BERTRAM PARK (London).—Mrs. Bryce.

FRANK DAVIS (London).—Dance of the Hoop.

BRYAN HORNER (Tunbridge Wells).—Elizabeth Ann.

A. F. KALES (Los Angeles).—Muriel Evans.

HOWARD COSTER (London).—Desmond Forbes.

MARIAN LEWIS (London).—The Niche.

The following are placed between pages 234 *and* 235.

JOHN ERITH (Croydon).—A Spanish Girl.

DOROTHY WILDING (London).—Enid Stamp-Taylor.

CHARLES WORMALD (London).—The Racer.

G. L. A. BLAIR (Paisley).—A Fresh Wind.

HERBERT BAIRSTOW (Halifax).—A Castle in Slate, Bethesda.

A. KEITH DANNATT (Surbiton).—The Model.

RONALD BEAUCHAMP (Dinard).—Denham Mill.

STEFANO BRICARELLI (Turin).—Fiat Works II, Turin.

G. L. HAWKINS (Oxford).—In Harbour.

WALDEN HAMMOND (Leamington Spa).—Gretchen.

CHARLES CLAYTON, JR. (Baltimore).—Orientale.

J. H. ANDERSON (London).—Building Operations.

CESARE GIULIO (Turin).—La Scia.

O. F. BUTLER (St. Leonards).—Mousehole.

A. L. HITCHIN (Newcastle-on-Tyne).—The Sham Fight.

ALICE ARMSTRONG (London).—Smiling Irish Eyes.

The following are placed between pages 266 *and* 267.

DR. JULIAN SMITH (Melbourne).—August Knapp.

FLORENCE B. KEMMLER (San Diego).—Sacred Solitude.

JAN DE MEYERE (Stockholm).—Inga.

J. O. ECHAGUE (Madrid).—Peasant Women.

CHARLES AYLETT (Toronto).—The Velvet Hat.

F. VAUDRY ROBINSON (Tasmania).—The Mystery of Distance.

JAN DE MEYERE (Stockholm).—Karin Leijonhufvud.

DR. D. J. RUZICKA (New York)—New York—The Pyramids.

CHARLES BORUP (Richmond).—Portrait of My Wife.

DR. JAN LAUSCHMANN (Czecho-Slovakia).—Garden Café.

A. F. KALES (Los Angeles).—Hide and Seek.

JOHN ST. AUBYN (Purley).—An Old Gable, Rothenburg.

B. & W. FISK-MOORE (Canterbury).—Romany Chal.

V. SARRA (New York).—Symphony in Blah.

JAN A. NEUMAN (Poland).—Fragment from Wilno.

A. VAN (Toronto).—Where Mystery Lurks.

The following are placed between pages 298 *and* 299.

GILBERT N. FUTCHER (Southsea).—Astarté.

H. E. WOOD (London).—The Glory of Old Age.

ETHEL M. EADON (Sheffield).—The Fan.

LEONARD MISONNE (Gilly).—Paysage Flamand.

HISSO E. KIMURA (Los Angeles).—Study, Mexico.

FRED JUDGE (Hastings).—Land's End.

FRANK H. MEADS (Barnet).—The Kill.

T. K. SHINDO (Los Angeles).—Noh Dancer.

JAMES MCKISSACK (Glasgow).—Over Sunday in Port.

HERBERT LAMBERT (Bath).—Roxana.

F. A. REAGER (Indianapolis).—Gray Dawn.

HUGO ERFURTH (Dresden).—Portrait.

RICHARD N. HAILE (Bognor Regis).—Wake-up Everybody.



THE CAMERA UPSIDE DOWN.

Cross and Falling Front.—E. F. Guiton has shown how the rising front of a camera may be utilised to provide great falling or cross movement of the lens, as is often required in architectural work. The camera is used upside down or sideways by means of a ball tripod head or tilting table.

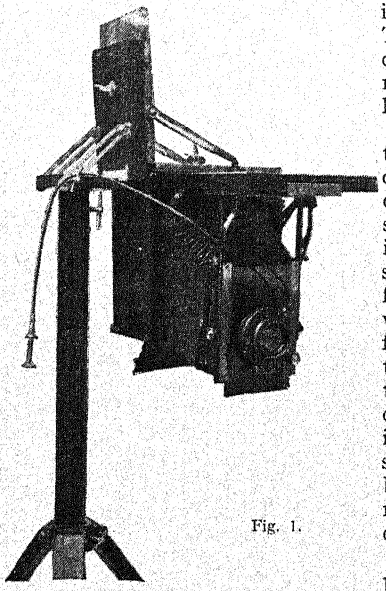


Fig. 1.

If the stand has no tilting top and the make of camera does not permit of fitting a bush in the side, all that is required is a flat piece of wood, say 12 in. × 3 in. × ½ in. for a half-plate camera, with a bush near one end for attachment to the tripod and a hole near the other end for the camera screw. The camera is then suspended alongside the head of the tripod, but upside down, and the movement required becomes available.

If the camera is of the pocket all-metal type, used on a metal tripod, the addition of a ball and socket head gives all the movement necessary, and enables the camera to be suspended in a reversed position.

In the illustrations, fig. 1 shows a Gandolfi half-plate "Universal" camera on a Korona stand with two tilting tables, each used at a right-angle. Fig. 2 shows a 9 × 12 cm.

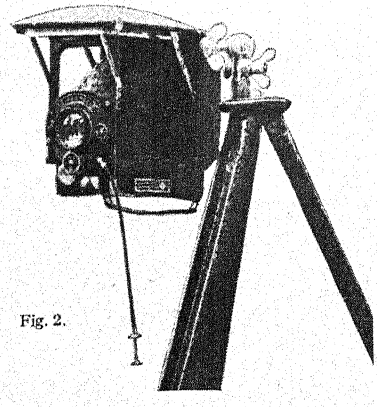


Fig. 2.

"Etui" camera on a Jaynay stand with ball and socket head. These two illustrations show the great falling-front movement obtainable by using the rising front with the camera upside down. In fig. 3 the Gandolfi camera is shown in use on the Korona stand, with one tilting table, thus providing great cross-front movement by means of the rising front.

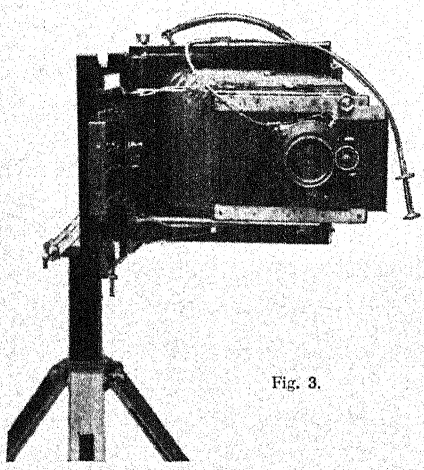


Fig. 3.

In architectural work ample falling movement of the front is often just as necessary as a rising movement, and this is so even when the subject is not one in which parallel lines are prominent. The movement is necessary in all subjects in order to preserve the correct proportions. For archæological subjects, such as dolmens, it is important to avoid all distortion, although such may not be apparent to the casual observer. The use of a great range of crossfront movement is especially valuable in architectural work in confined situations. Not only must the plate be vertical; it should also be as nearly as possible parallel with the subject. Although the illustrations may suggest that the cameras are awkward in use when thus employed upside down, this is far from being the case, whilst the results compensate for the extra trouble.—B.J., 1931, June 26, p. 378.

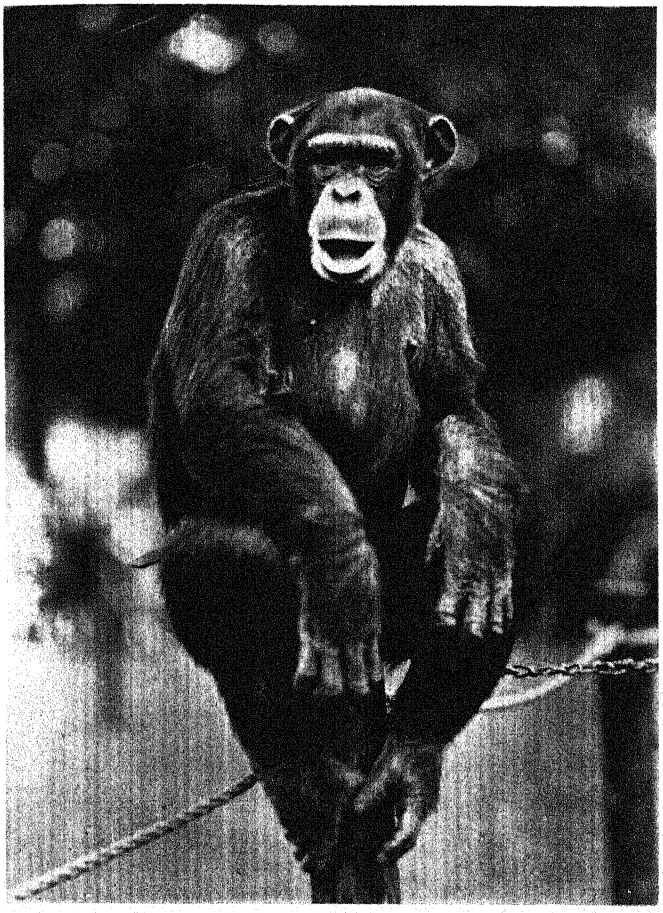


THE DIVER

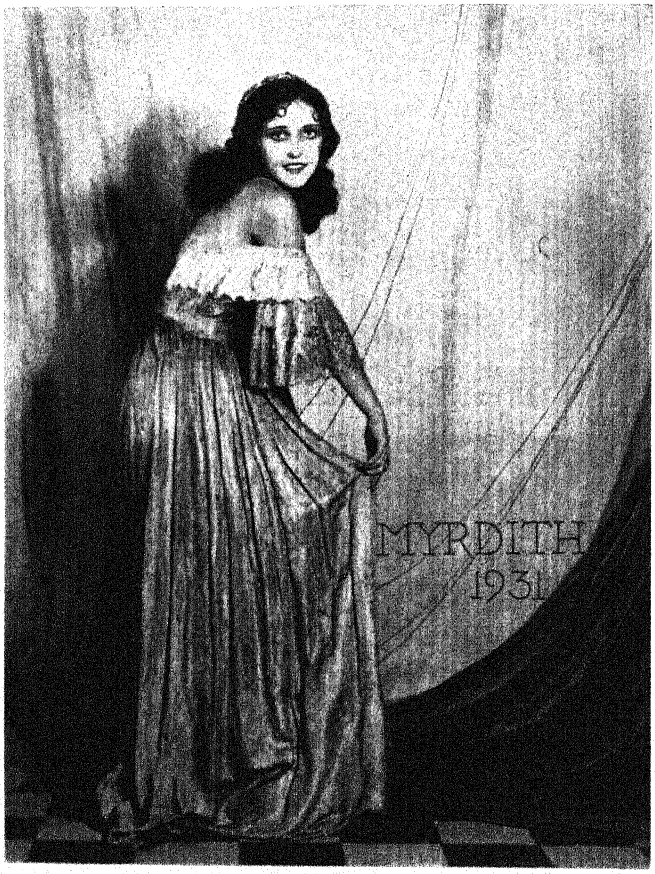
JAS. C. H. BALMAIN



A DANCER YVONNE GREGORY

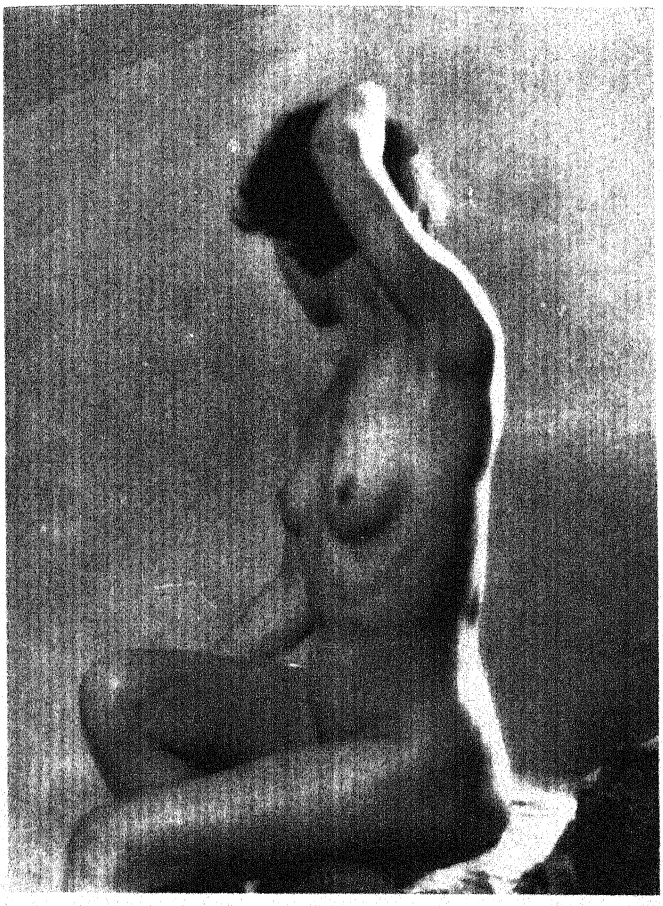


THE CHIMPANZEE J. E. SAUNDERS



MYRDITH. MONAGHAN

W. MORTENSEN



ETUDE DE NU — WALDEN HAMMOND



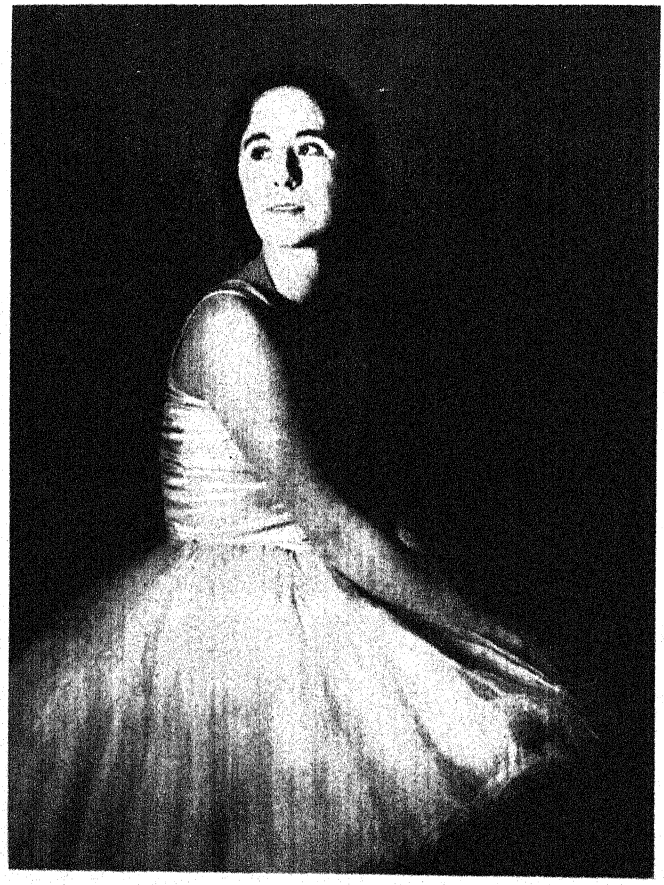
LADY HONOR VAUGHAN

MARCUS ADAMS

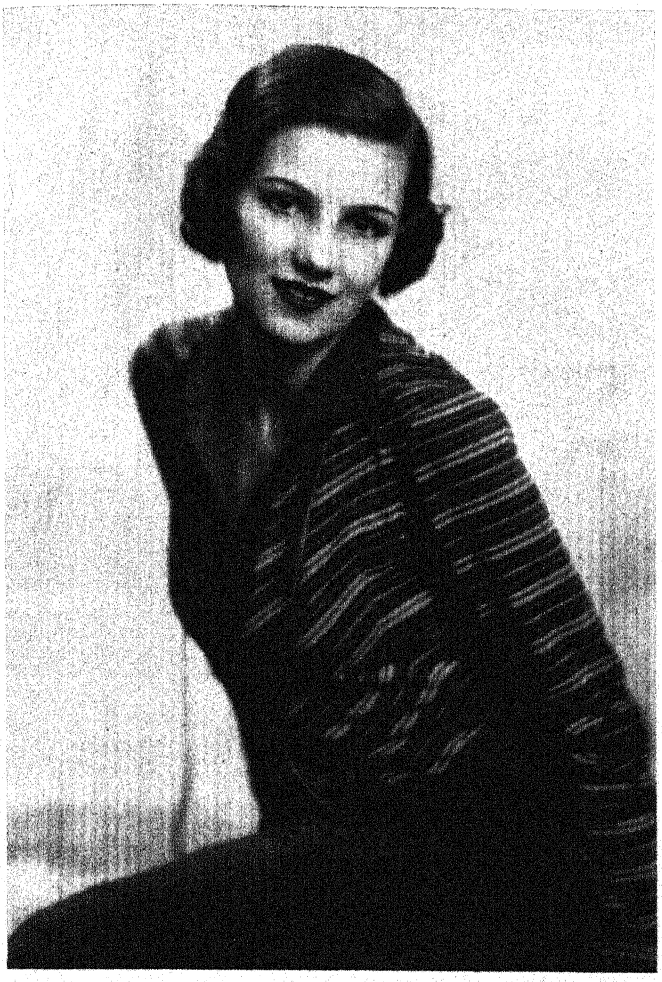


THE WINDOW PANE

EM. SOUGEZ



A DANCER — W. A. BLANCHARD



MRS. BRYCE

BERTRAM PARK



DANCE OF THE HOOP

FRANK DAVIS



ELIZABETH ANN

BRYAN HORNER



MURIEL EVANS

A. F. KALES



DESMOND FORBES

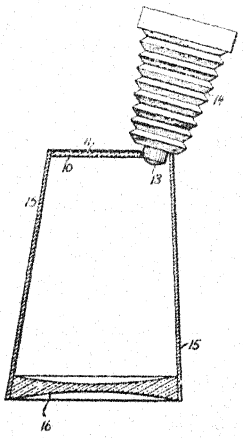
HOWARD COSTER



THE NICHE MARIAN LEWIS

SELF-PORTRAITURE.

Self-Portrait Cameras.—An optical appliance by means of which the sitter is able to view his or her reflection (on a reduced scale) in a mirror up to the instant of exposure and can be actually alone when making the exposure is in use in the United States.



The appliance is described in Eng. Pat. No. 349,476 by L. G. Simjian and consists of a box or hood 15, in the front of which is a concave lens 16. At the back of the box is a mirror 10, silvered on the back 11. The camera 14 is fixed at a slight angle, with the lens 13 projecting through an aperture in the mirror. The sitter sees a small scale reflection of himself in the mirror.

It is claimed that the slight distortion due to the angled position of the camera is offset by the action of the negative lens 16.—B.J., 1931, July 17, p. 427.

Overhauling Metal Dark-slides.—While single metal dark-slides are capable of giving many years of service, if carefully used, a little attention now and again is well repaid.

Often the shutter does not slide in and out freely, as it should. If the shutter is not a good fit in the slide, the probable reason is that the slides have been exposed to damp weather and have not been thoroughly dried. In bad cases it may be necessary to clean off the old enamel with emery cloth and re-coat with cellulose paint: any enamel containing turpentine must be strictly avoided. In other cases it will be enough to smooth the edges with fine glass-paper and then rub a pencil point along on both sides as a lubricant.

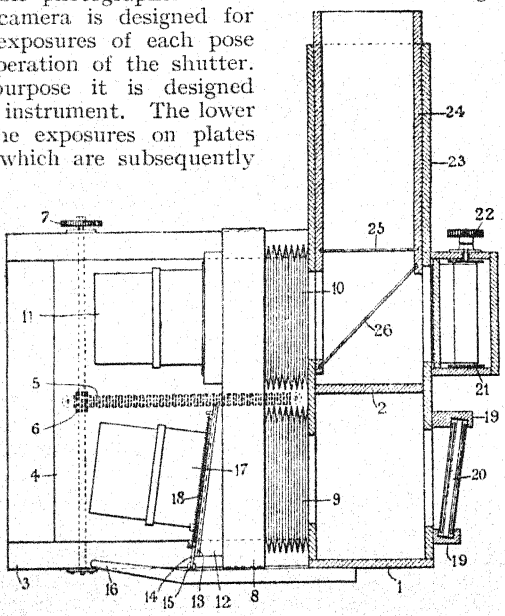
Flattened velvet light-traps can be revived by exposure to steam from a kettle spout: but to avoid the need, dark-slides should be stored with the shutters taken out, whenever possible.

Users should bear in mind that if the shutter is constantly pressing on the velvet the "pile" of the latter loses its spring. They should take a hint from some makers of single slides, who send them out with the shutters separate.—B.J., 1931, September 25, pp. 569-571.

A CAMERA FOR PROOFS WHILE YOU WAIT.

A Studio Camera of a highly novel pattern is the subject of a recent patent by Mr. Hugh Cecil Saunders, well known as a fashionable photographer under the name of "Hugh Cecil." The camera is designed for making two exposures of each pose at a single operation of the shutter.

For this purpose it is designed as a twin-lens instrument. The lower lens makes the exposures on plates or cut films, which are subsequently used for the preparation of the photographs actually supplied to the sitter. The upper lens makes a corresponding series of exposures on thin sensitive celluloid film. This band of film can be developed and reversed to a positive within a few minutes, thus enabling the results of the exposures to be shown to sitters before they leave the studio.



The camera body 1 is divided into two chambers by the partition 2.

The front carries a fixed lens 11 and a triangular carrier 12. On the front of the carrier 12 is a slide (indicated by the broken line 13) having a lateral projection 14, in the end of which is pivoted a roller 15. This latter makes contact with a fixed cam 16, and as the board 4 is moved away from the body, the cam 16 moves the slide carrying the inclined lens 17 towards the lens 11. Due to the inclination of the axis of the lens 17, the optical axes of the two lenses are always directed towards the sitter.

Behind the inclined lens and fixed to the body 1, are a

pair of slides 19 to carry an ordinary double dark-slide 20 at an angle to the back of the body 1, and perpendicular to the axis of the lens 17. This dark-slide is adapted to carry cut films or plates.

Behind the lens 11 there are a pair of spools adapted to carry a roll of film which is rotated by the milled button 22. Only one of the spools 21 is shown in the drawing. This film is developed and reversed, to be shown to the sitter.

The body has a lateral tube or guide 23 in which slides an inner tube 24 which is open at its outer end. This inner tube 24 carries a ground-glass screen 25 on to which the image passing through the lens 11 is projected by the inclined mirror 26, when the tube 24 is in its inner position. In this position the mirror 26 cuts off all light from the film carried by the spools. Before making an exposure the tube 24 is withdrawn partly, thereby moving the mirror 26 out of the path of the rays passing through the lens 11.—Eng. Pat. No. 345,261, B.J., 1931, Apr. 24, p. 247.

SHOP WINDOWS.

Shop Windows without Reflections.—In the photography of shop windows the great difficulty is that of reflections in the windows. A practical method of overcoming this difficulty, when the requirement that the facia must be included prevents the taking of the window by night, has been recommended by L. G. Sandys.

The photograph is taken in the usual way, but choosing a time at which the daylight is just beginning to fade. With the window lights on, there will be no trouble with reflections, owing to the low outside illumination, but details of the exterior of the shop will still be obtainable.

The resulting negative will, however, show the shop window so much denser that direct printing will not be practicable. Separate prints are therefore made, one showing the exterior of the shop at its best, the other showing the contents of the window in full gradation. The window portion of this latter print is then cut out, stuck in the proper position on the first print, and a copy negative made of the whole.—B.J., 1931, Jan. 30, pp. 59-60.

C. Stewart Chaplin points out that the first point to observe is whether it is practicable to take the picture with a long-focus lens from the far side of the road, which is often an advantage. The effect of a bright sky facing the shop can

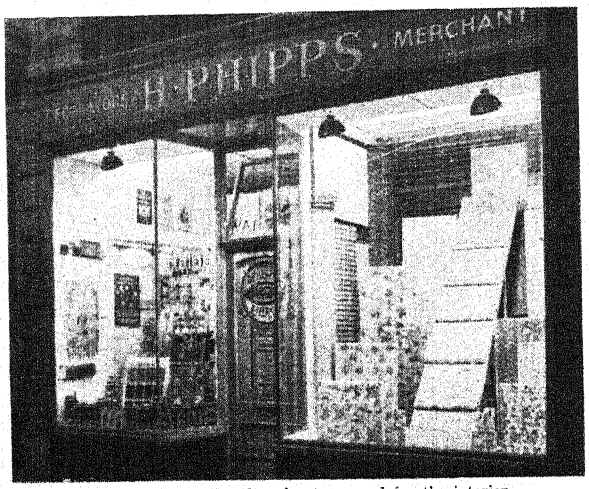


Fig. 1. Shows the shop front exposed for the interior.

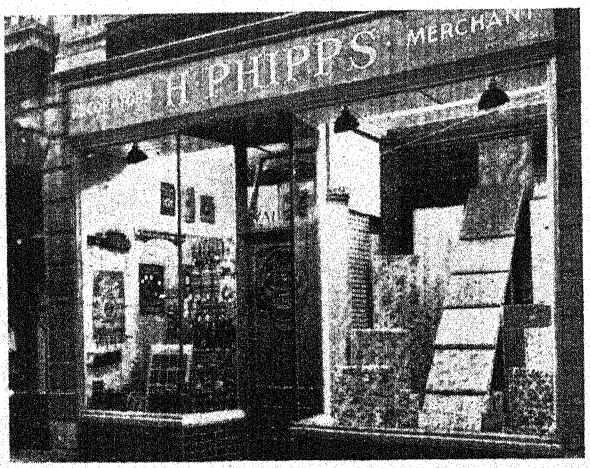


Fig. 2. Shows the print from the copy negative made as described.

SHOP WINDOWS WITHOUT REFLECTIONS (*See previous page*).

be very greatly diminished by using a panchromatic emulsion and a fully correcting or a contrast filter, *e.g.*, a Wratten K.3 or Contrast G. Besides their effect in diminishing reflections, these filters naturally affect the colour rendering of the objects displayed.

An alternative which is often very valuable is to photograph the window at night by the electric illumination provided for the window display. This eliminates all reflections except those of the shops opposite, and by choosing a suitably late hour even these can be avoided. As the top of a window is usually more brilliantly lighted than the bottom, full exposure and soft development are necessary, followed perhaps by shading in printing.—B.J., 1930, Dec. 12, pp. 744-745.

REFLEX COPYING.

With Ordinary Papers.—The value of the little-known Playertype or reflex-copying process to the working photographer, for such purposes as the copying of documents, has been emphasised by D. Charles, who has drawn attention to the successful use that can be made of it even with ordinary materials and appliances.

The process consists in laying a sheet of sensitive paper face downward on the original or printed matter to be copied, in close contact, and exposing the sensitive paper *through* its support to filtered yellow light. In addition to the general fog which this exposure produces, the light reflected back from the white parts of the original gives a further light-action sufficient to produce a clear image of the printed matter on the paper on development.

The best easily obtainable paper, according to these recommendations, is Imperial "99" or Illingworth "Photomechanical," but ordinary brands of extra-contrasty paper have given excellent results. The special process papers are preferable, owing to the more regular density of the paper base, but such irregularities in density as do arise when ordinary papers are used are rarely objectionable and can usually be eliminated by a little reduction of the print to clean up the white ground.

Whilst a yellow filter is essential if a presentable copy is to be made, it does not need to be of any very exact kind. So long as it is of bright golden yellow, it may be either yellow glass or a dyed gelatine filter, and it may either be immediately over the paper in the printing frame or over the lamp in the lantern by which the exposure is made. Yellow

gelatine film, as made for tinters of theatrical spotlights or shop window fixtures, serves excellently, used in two or three thicknesses.

The process will only reproduce tone subjects well enough for rough purposes, but for line work it has actual advantages over camera copying. For example it will give added strength to faint parts of an original such as pale ink lines or pencilled notes, and it reproduces markings in coloured ink or pencil much as though they were black. But good copies are difficult to produce when the actual paper of the original is tinted.

The exposed paper is developed in a concentrated bath for maximum contrast; this gives the paper negative which, when dry, is printed in the usual way, without waxing in any way and without a yellow filter.

The success of the method depends on keeping conditions, such as the distance and the power of the exposing lamp, reasonably constant, so as to permit exact control of the exposure. With some extra-contrasty papers this exact exposure is vital. At one exposure they give a pale grey; the least bit more, and they produce a black. It is this fact that is made use of in this process, and hence there is not a lot of latitude in exposure. Constant conditions and timed trial strips at each time of working will give the best guidance in the practice of this process.

The negative produced will look horribly grey and foggy, yet may give an excellent copy when printed on a contrast paper.

The one difficulty in the process is that of obtaining good contact, which is obviously essential. If creased, the original should first be flattened in the dry-mounting press. Then, up to about 15 × 12 in. it is usually sufficient to press the original and the sensitive paper between sheets of plate-glass for exposure. If the process is to be worked regularly or in large sizes a proper vacuum pressure-frame as used by process engravers is advisable.—B.J., 1931, Mar. 20, pp. 164-166.

Dr. H. E. Durham has recorded his experiences with the process of copying line illustrations by direct reflex printing, in which a negative image is made on a sensitive paper or film, which is pressed into close contact with the original and exposed through the support.

For the particular purpose in view, Kodak Transferotype bromide paper and Diaphano positive film were used in preference to plates, owing to a risk of damage to the originals.

The sensitive material is placed on the surface of the page to be copied, a glass colour filter laid on and pressed down to make close contact. The exposure is then made by burning a measured length of magnesium ribbon, held in tweezers and waved gently about a foot above the pack. Three varieties of filter were tried :—

(1) Lantern ruby glass with 5 in. magnesium. With this, Transferotype paper gave no image ; film was pretty good, but elongated bubbles in the glass show badly.

(2) Yellow-orange safelight with 3-4 in. ribbon for Transferotype, or 1 in. for film.

(3) Chance's green filter for trichrome exposures gave quite good lines with 4 in. ribbon and Transferotype.

Amidol-paraphenylenediamine developer with bromide was used for the earlier trials, usually for about 5 minutes. Later, ferrous oxalate diluted to half stength for 6-7 minutes.

With Transferotype paper the grain of the base interferes very little indeed, even with a copy of a fine line engraving, but stripping seems necessary as a prelude to intensification. Transferotype negatives were stripped on to thin Autotype single transfer paper, previously varnished with shellac-borax (shellac 20, potash-borax 4, soda carbonate 1, water 200) and then waxed with a benzol-moistened rag and spermaceti-beeswax (equal parts). Finally they are transferred to gelatined glass plates.

The developed negatives are intensified by means of the copper iodide-silver nitrate process, with either one or two applications.

As a practical routine the use of Transferotype paper, with a yellow filter, 3-4 in. of ribbon and one intensification, is recommended.—B.J., 1931, Jan. 9, p. 19.

NEGATIVE PAPERS FOR COPYING.

Process Papers.—For many purposes of commercial copying—for example in the copying of line drawings, music, letterpress, etc.—R. B. Willcock finds it very satisfactory, and economical to use the negative process papers instead of plates or films. A saving of about 75 per cent. on the cost of materials is made in this way.

There are three well-known makes of process paper, either of which is very suitable for this employment, viz. :—"Kodaline," Kodak Limited ; "Imperial 99," Imperia.

Dry Plate Co., Ltd., London; "Typon," Typary and Typon, Ltd., London.

The manipulation of process paper is similar to that required for film of like character, and it should be loaded, and developed by the aid of a "Wratten," Series 1 safelight. The paper is conveniently used either in a Kodak film slide or in a film sheath in an ordinary dark slide.

The makers of Imperial "99" and "Kodaline" paper recommend special contrast developers which are here given.

	Kodaline.	Imperial "99."	Imperial Process.	Gevaert for soft prints.
Metol	1·25 gms.	1·25 gms.	2 gms.	200 grs.
Hydroquinone...	6 gms.	6 gms.	8 gms.	15 grs.
Soda sulphite ...	34 gms.	45 gms.	100 gms.	5 ozs.
Soda carbonate	80 gms.	80 gms.	100 gms.	4 ozs.
Potass. bromide	·6 gm.	·6 gm.	·8 gm.	40 grs.
Water	1,000 c.c.s.	1,000 c.c.s.	1,000 c.c.s.	80 ozs.
	1	2	3	4

The formulæ given in columns 1 and 2 should be used at 65 to 68° F., development being completed in 2 minutes. The Imperial process developer in column 3 is more active and more suitable for photographic work. Where excessive contrast is not of vital importance, both papers discussed respond well to the Wellington Standard M.Q. developer or to the formula given in column 4.

Negative paper is unfortunately liable to pleating or cockling. The best method of preventing cockling in drying is to blot off all surplus water and saturate the negative in methylated spirits. After blotting off again, it should be dried by passing through a rotary drier, between clean blotting paper. If pleating or cockling is to be prevented after the negative is dry, masking of any part by opaque fluid or adhesive paper should be avoided, loose masks being employed instead. In obstinate cases of bad contact extra strong springs may be fitted to the printing frame, and the use of "Sorbo" rubber sheet in place of cloth padding of the frame back will help considerably.

"Kodaline," and Imperial "99" Ortho papers are colour-sensitive to a marked degree, and with suitable filters correct well for orange, yellow, and green.

Negative papers of the kind mentioned may be used with equal success as positive printing papers on occasions which demand a light-weight, and contrasty material. They possess a degree of contrast equal to that of the most vigorous

grades of gaslight paper. They can, however, by suitable treatment, be made to yield well graded prints from continuous-tone negatives. A slightly increased exposure, followed by development in the Gevaert formula for soft prints—given in column 4 in the list of developers—will, in nearly every case, produce prints of full gradation without loss of colour.—B.J., 1931, Feb. 27, pp. 121-122.

THE VERTICAL CAMERA.

A Cantilever Wall Bracket.—An installation for vertical photography, especially advantageous in the commercial studio, has been designed by D. Charles to fold against the ceiling when not in use and thus occupies no floor space. At the same time it will permit even as large a subject as a flat carpet 12 ft. wide to be photographed.



Fig. 1. The cantilever in use, showing the entirely clear space round the camera.

As will be seen from the photographs, the apparatus consists of a camera board supported vertically by twin pairs of cantilever arms, which are themselves fixed to a plate on the wall. This latter plate is only fixed by a hinge at the top, so that when not in use the whole system can be swung upwards (fig. 2) and hooked up against the ceiling.

Further, the hinged back provides also a means of very fine adjustment to ensure the camera board being vertical if at any time an

extra heavy camera or some other circumstance should throw it out. That adjustment is provided by a couple of thumb-screws, of the pattern known as perambulator-hood screws, working in bushes on the lower corners of the black-board against the wall.

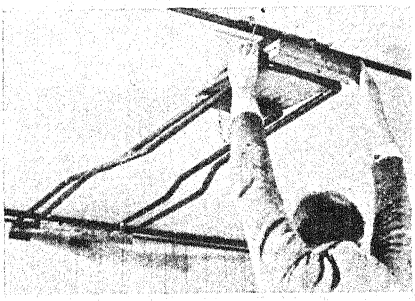


Fig. 2. Showing the ease with which the bracket is let down for use and afterwards hooked up in place.

The pair of iron arms are formed of 1-in. electric conduit tube. The lengths are joined by means of elbows at the corners and a "union" piece in the middle of the back end, the latter being secured by a locking nut. The necessary bearings consist merely of the ordinary bent clips or staples for securing piping to the walls of a house. The four pairs of bearings are fixed so that the two bars will be parallel along their whole length. That is to say, both the black-board and the camera-board should carry their pairs of bearings at the same distance apart from top to bottom. A recess is cut in the backboard on the wall to accommodate each of the locking-nuts in the back ends of the iron frame.

The actual dimensions of the bracket illustrated are as follows:—The backboard is 22 in. × 18 in. The frame bars are fixed 9½ in. apart, and are 6 ft. long. The width of each frame is 10½ in. at the narrow end and 18 in. at the wide end. The front camera board is 18 in. × 11 in., and has a slot a full ¼-in. wide running down its full length, to permit of the camera screw going right through it at any point. This permits of any camera being used, and of a certain amount of adjustment up and down. On the front face of the camera board two extra strips of wood, about an inch thick, are screwed. These were rendered necessary by discovering that the board was rather wide for the average camera, and the focussing pinion was liable to be thrown out of use and injured by compression against the large baseboard.

The slot in the camera board referred to has now been

faced on its back surface with a pair of flat metal strips to take the wear of the heads of the camera screws. A specially long screw is of course required to secure the camera through all these thicknesses, but a $\frac{1}{4}$ in. Whitworth screw is quite suitable for the purpose.

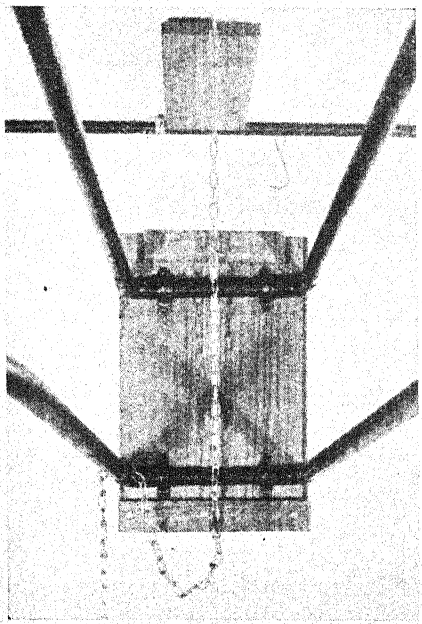


Fig. 3. The camera board is supported by a strong chain hanging from a screw-eye in the ceiling.

The best method of fixing the camera in working position has proved to be by means of a central chain (fig. 3). The chain is fixed to a screw-eye in the ceiling and, by means of a hook fixed in the bottom of the camera board, serves to fix the board at any desired position according to the particular link which is engaged with the hook. B.J., 1931, Jan. 2, pp. 3-5.

Vertical Copying.—Many subjects which are most easily laid out flat for photographing are found to give unexpected trouble on account of the special difficulties of photographing vertically. David Charles has pointed out the best solutions of these problems.

The first difficulty is that of examining the focussing screen. It may call for the use of a pair of steps, which will probably be found to interfere with the viewing or lighting of the subject. To overcome this, it is recommended to examine the image on the focussing screen indirectly, by means of a small mirror held at arm's length over the camera; in this way the operator can manage very well with a lower

support placed further away, for example, a small stool or chair. To make this easier a rapid lens should be used, and the illumination concentrated on the subject, so that the camera is kept as far as possible in darkness.

Large subjects are best laid down right on the floor. Lighting the subject and operating the camera are easier with this low position. Aiming the camera at the subject is apt to be a difficulty, as it involves shifting the subject about on the floor more or less by guesswork. It is a good plan to place the subject and its background on a flat board, which can be slid about without altering the arrangement. Much time and trouble can be saved by having an assistant who will move the subject (or parts of the subject) in accordance with the instructions of the operator, the latter being free to observe the image on the ground-glass.

When parts have to be arranged in accordance with a set pattern, a series of parallel guide lines ruled on the ground glass itself is most useful.

With a lens cap that is a tight fit, the act of taking it off may set up serious vibration with the camera fixed up vertically. It is therefore wise to hold the cap just clear of the lens for a moment or two to allow the vibration to settle down. In many cases the best method of all of making the exposure is with the main electric switch, drawing the dark-slide and uncapping the lens in the darkness.

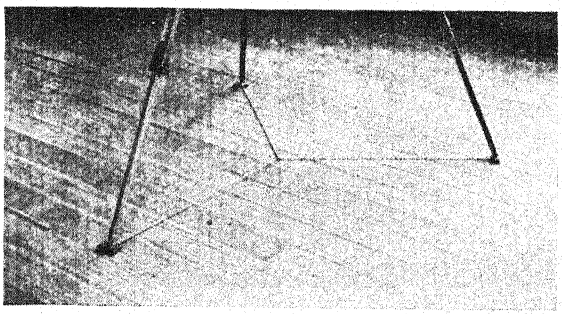
In the case of polished subjects or aluminium articles, which depend for their characteristic appearances on reflectors, it is important not to shroud the camera too generously with overhanging black cloths; these will have the effect of unduly darkening the reflecting surfaces. It may be advisable to wrap a white cloth outside the black, or to fix a white paper or card horizontally in front of the camera with the lens protruding through a hole. Alternatively a sort of tent of muslin, pinned round the lens at the top and stretched out beyond the margins of the subject may be used. With an outside lighting, this gives a beautifully even spread of light on to the subject.

With the camera vertical, there is very likely to be some sagging of the parts. It is advisable to use a spirit level to check the important alignments just before the final focussing. A rigidly constructed camera, with rather loosely fitting dark-slides, is essential for this kind of work.—B.J., 1931, Aug. 7, pp. 467-468.

TWO TRIPOD HINTS.

Non-Slip Tripod.—Another solution—very neat and inexpensive—of the old problem of the slipping tripod, when a camera is to be set up on a well-polished floor, has been described by a correspondent.

The device consists of about 6 ft. of light chain procured from the ironmonger, together with a small joining link. Divide the chain into three pieces of equal length, connecting together one end of each with the joining link. To the other end of each chain attach with a screw eye a small piece of hard wood of about 2 in. × 1 in. × ½ in., into which has



been drilled a small hole to take the metal points of the tripod leg. The gadget is now complete and weighs only three ounces. Its mode of use is illustrated. The purpose of the wooden pieces is for use on wooden floors, etc., that must not be scratched, otherwise the chain alone could be used by catching the tripod points in any of the links.

If it should be impossible to use the appliance on the floor, it can be used at the level of one of the joints, by slipping a link over a small screw hook fixed on the tripod. The convenience of this inexpensive appliance, when using a camera on polished floors, must be experienced to be believed, whilst the length of chain takes up practically no room in the camera case.—B.J., 1930, Dec. 19, p. 771.

Tripod for Press Work.—The Jaynay tripod, which is undoubtedly the favourite amongst Press operators, can be improved for rapid use by carrying out a small alteration recommended by "Focal-Plane."

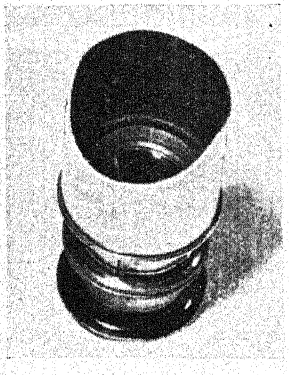
This is to fix the tripod screw permanently so that it will not turn in its seating. It is then a moment's work to hold

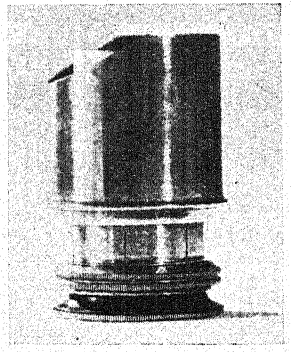
the camera in one hand, the stand, folded, in the other, and thread the screw into the base of the camera.—B.J., 1930, Dec. 26, p. 784.

FOCUS AND VIEW IN INTERIORS.

View-finder for Interiors.—It is not generally realised that a direct-vision view-finder, for example the pattern employing a plano-concave lens, has special advantages for the interior worker. The brilliance of the image, which is the right way up, and the fact that the angles and lines made in the picture by foreground objects can be studied very readily, make this type of finder immensely superior for composing interior pictures.—B.J., 1931, April 24, p. 237.

Magnifier for Interior Work.—The conventional form of focussing magnifier, which has to be used in a position perpendicular to the focussing screen, is really only serviceable for the central parts of the screen; the image at the edge of the screen is not seen brightly enough unless the screen is viewed with the magnifier held obliquely.





D. Charles recommends adapting an adjustable magnifier for use in this way by cutting away part of the mount of the magnifier so as to make it easy to incline the magnifier to the ground-glass.

If it should be found, as in the example illustrated, that part of the inner tube bearing the actual glasses projects across the

line of the desired cut, it can be adapted by shortening the inner tube. This job can be done quite easily by an optician or camera mechanic.—B.J., 1931, April 17, p. 224.

FOR COPYING SMALL OBJECTS.

Wire and Pin Supports.—Two ingenious devices which will often serve to overcome a difficulty in fixing small objects in position for photographing have been described by D. Charles.

The first is of service when an object can be supported by upright wires, and consists of a support improvised from a bicycle spoke. The spoke is bent at right-angles in the middle, and one of the legs is then again bent into a hairpin shape. This latter allows the bent side to be pinned down to a board by drawing-pins while still permitting of easy adjustment, and the single leg stands upright and stiff.

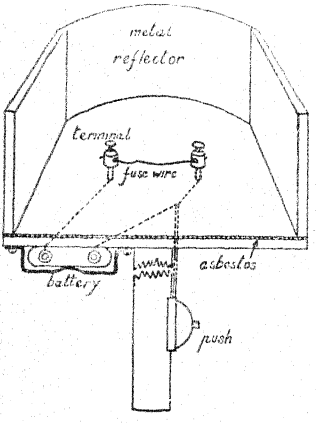
Objects which are liable to roll are suitably supported by four needles, driven into a board or bit of lino in the form of an X. The tops of these crossed needles form four points on which the objects lie clear of the ground, so avoiding definite shadows; and while being prevented from rolling, there is freedom for adjustment, so that any required detail can be easily presented to the lens. At the same time the whole can be moved about or even canted at an angle without the object rolling off.—B.J., 1930, Dec. 19, p. 759.

FLASH-LAMP FOR BATTERY FIRING.

How to Make or Adapt.—J. Chamberlain gives working instructions for making a lamp for electric firing of flash-powder by means of a fuse wire. The base is hard wood, about 6 × 6 in. and slightly rounded at one end. It is covered with a thin sheet of asbestos to prevent the flash-powder from burning the wood. Two wooden sides are then screwed to the base and a piece of "tin"—to act as a reflector—is bent round the curved portion of the base and secured to the two sides by small wood-screws. Two wireless terminals are now fixed to the base at a distance of about 3 in. apart. The handle is secured to the centre of the base by a 3-in. countersunk wood-screw the head of which is covered by the asbestos sheet. To the lower end of the handle a fairly short bell-push is fixed.

A battery is now procured and fixed by any convenient method to the under-side of the base-board. The battery

may be of the type used in large electric torches, but is preferably a small unspillable celluloid accumulator; these accumulators are used for working small models and can be purchased at many toy-shops.



It now only remains to connect up the various components. This should be easy with the aid of the diagram. One terminal of the battery is connected to one terminal of the bell-push, the other being connected to one of the terminals on the base-board. The remaining terminal of the bell-push is then connected to the remaining base-board terminal. It is immaterial what kind of wire is used provided that it is well insulated and reasonably thick.

A supply of one-ampère fuse-wire is cut into lengths, long enough to stretch between the terminals.

To work the flash-lamp, a piece of fuse-wire is inserted between the terminals, and the flash-powder spread over it. The lamp is then held above the head and the button of the push depressed. This action sends a current through the fuse-wire, heating it to melting point and thus igniting the powder.

By extending the wires from the bell-push by means of a length of "flex," the flash-lamp may be operated from a "pear" push held in the photographer's hand, and thus fired simultaneously with the opening of the shutter. Existing flash-lamps may easily be "electrified" provided that the base is not made of metal.—B.J., 1931, Jan. 16, p. 40.

PHOTOGRAPHS FROM CAPTIVE BALLOON.

Exposure by Ground Control.—An Austrian photographer, Josef K. F. Naumann, of Bregenz, has made commercial use of a process of taking aerial pictures at low altitude by means of a small captive balloon carrying an electrically controlled camera. For such purposes as picture postcard production and the photography of factories, etc., the method is claimed to be thoroughly practical.

The balloon, about 4 ft. in diameter, is filled with hydrogen and carries a 6 × 4 in. camera swung below it, by means of a

twisting frame and lever system. This latter is contrived so that the camera can be turned in any direction whilst in the air, the direction in which the camera is pointing being shown by a large arrow attached to the body. The cable which secures the balloon to its station on the ground serves to conduct the weak electric current which releases the shutter when the exposure is to be made.—Phot. Korresp., 1930, Nov., pp. 303-305.

HYPER-SENSITISING.

Hyper-sensitising Portrait Panchro Film.—It is stated that the following formula is advocated by the Eastman Kodak Co. for the hyper-sensitising of Portrait Panchromatic cut film :—

Ammonia, conc	10 c.c.s.	100 minims
Glycerine	8 c.c.s.	75 minims
Water (distilled) to make ...	1,000 c.c.s.	20 ozs.

The films should be bathed in this solution from three to four minutes, at a temperature of about 50-60° F., and dried as rapidly as possible in a current of dry air, which should be about 80° F., the process being carried out in a completely dark room.—Photo-Era, 1930, Dec., p. 311.

FOR ANTI-HALATION.

Stripping Backing Sheets.—A French experimenter, H. Cuisinier, in a report of tests of different methods of protecting plates from halation, describes the use of adhesive black paper as a really effective preventive which is very suitable for studio exposures. As the papers are applied moist it is not possible to use them for purposes which may entail leaving the plates in the slides for any length of time. The papers can be stripped after exposure and used repeatedly.

Sheets of stout black paper such as used for plate wrappings are prepared by floating on a mixture of :—

Gelatine	150 gms.	3 ozs.
Glycerine	150 gms.	3 ozs.
Chrome alum	5 gms.	44 grs.
Nigrosine	2·5 gms.	22 grs.
Water to make	1,000 c.c.s.	20 ozs.

This mixture is kept at about 140° F. on a waterbath. When the sheets are well impregnated they are drained and set aside for a week. In use they are applied to the backs of the plates and squeegeed down. It is, of course, essential to apply the sheets to the glass surface so that bubbles of air are not trapped. —Le Phot., 1931, August 20, p. 318.

DEVELOPERS.

Metol-Borax Formula.—In preference to the known borax-metol-hydroquinone developers for fine-grain images H. Cuisinier has worked out a formula without hydroquinone and recommends it as giving very good results with various makes of plates and cine-films. Its advantages are easy compounding, good keeping quality, and prolonged activity. It is not highly susceptible to the presence of dissolved bromide. It is not greatly affected by the cold and produces clean negatives of normal contrast, without veiling or dichroic fog.

Borax, cryst.	2 gms.	18 grs.
Metol	4 gms.	35 grs.
Sodium sulphite, anhyd. ...	150 gms.	3 ozs.
Boiled water to make ...	1,000 c.c.s.	20 ozs.

The borax is first dissolved in four-fifths of the total volume of hot water. The solution is left to cool down to about 130° F. when a pinch of sulphite taken from the measured quantity stated is added. The metol then follows, and after complete solution the rest of the sulphite. Add boiled water to make up the full volume and filter through cotton wool.—Le Phot., 1931, July 5, p. 261.

Adurol-Eikonogen Developer.—Dr. Moir Dalzell strongly recommends an adurol-eikonogen developer which he has worked out, regarding it as giving specially beautiful results in the rendering of sunny subjects. It is made up from two stock solutions :—

A.	Soda sulphite, anhyd.	60 gms.	525 grs.
	Adurol	10 gms.	90 grs.
	Eikonogen	24 gms.	210 grs.
	Boiling water	1,000 c.c.s.	20 ozs.
B.	Potass. carbonate ...	20 gms.	175 grs.
	Water	1,000 c.c.s.	20 ozs.

If made with actually boiling water the solution A keeps well, if protected from air. For solution B, pure, dry carbonate is used.

A two-bath method is recommended for doubtful exposures. Into one dish pour 100 c.c.s. of A and 5 c.c.s. of B ; in a second pour 5 c.c.s. of A and 100 c.c.s. of B. For fully-exposed average subjects the first dish only will be necessary, and will give a fine-grained, blue-black image of good gradation.

If over-exposure is suspected add 1-2 c.c.s. of 10 per cent. potassium bromide solution to the contents of the first dish : the adurol-eikonogen mixture reacts excellently to the restrainer.

For short exposures or harsh subjects use is made of the second dish. Development is begun in the first dish : but, as soon as one can see, by reflected light, either the sky in a landscape or the lines of demarcation between the forehead, hair and nose in a portrait, the negative is transferred to the second bath, where development is continued. If further contrast is required, the first bath may be applied again.—Camera Craft, 1931, Mar., pp. 122-125.

Amidol Developer that Keeps.—The addition of other developing agents to ordinary amidol developer, for the purpose of preserving the amidol against oxidation and thus giving it improved keeping quality, is a practice often recommended. One such formula, giving an amidol developer capable of being kept in working condition for several weeks, is as follows :—

Sodium sulphite	13 gms.	115 grs.
Amidol	5 gms.	45 grs.
Adurol	2·3 gms.	20 grs.
Potassium bromide ...	1·4 gms.	12 grs.
Water	1,000 c.c.s.	20 ozs.

This developer works well with both bromide and chlorobromide papers, and gives a much warmer tone than does amidol alone.—A.P., 1931, September 9, p. 242.

Staining Pyrocatechin for Minimum Exposures.—According to Professor R. Namias, a pyrocatechin developer made up without the usual sulphite as preservative is excellent for making the utmost of plates that have received much too short exposures.

Such a developer, which brings up a silver image combined with a heavy stain image, may be made up as follows :—

A.	Pyrocatechin	5 gms.	44 grs.
	Water	500 c.c.s.	10 ozs.
B.	Soda carbonate ...	40 gms.	350 grs.
	Water	500 c.c.s.	10 ozs.

For use, these solutions are mixed in equal parts. This mixture develops a plate in from 30-45 mins., and gives images of brown colour and maximum density. It is not permissible to use safranine desensitiser with this developer, as it gives general yellow fog : the effect is much less with pinacryptol green, but for the clearest negatives even this must be avoided.

An alternative formula is as follows :—

A.	Pyrocatechin	5 gms.	44 grs.
	Water	500 c.c.s.	10 ozs.
B.	Caustic soda	4 gms.	35 grs.
	Water	500 c.c.s.	10 ozs.

Immediately before use these solutions are mixed in equal parts. Development takes from 20-30 minutes. In this time the bath discolours very strongly, but without staining the gelatine. It is best to replace the developer every 10 minutes with a freshly mixed sample. Brown negatives are produced, again with maximum density.—Phot. Korresp., 1931, August, pp. 33-36.

Non-poisonous Universal Developer.—Photographers subject to metol poisoning are strongly recommended, by G. L. Boulet, to adopt the use of a one-solution paramidophenol developer which acts admirably for all kinds of negative and print development, is quite stainless and shows no poisoning action, even on persons very susceptible to metol poisoning. It is made up easily and inexpensively as a stock solution that keeps very well. The formula is as follows :—

Water (hot)	120 c.c.s.	4 ozs.
Potassium metabisulphite...	36 gms.	540 grs.
Paraminophenol hydrochloride	12 gms.	180 grs.

Boil the water for about a minute or two. Remove from heat and add a few crystals of potassium metabisulphite, about five to ten gms. (100 to 150 grains), and stir until dissolved. Then dissolve all of the paraminophenol hydrochloride with stirring. Next dissolve the remainder of the potassium metabisulphite. Then add a cold solution of caustic soda or caustic potash very slowly, with constant vigorous agitation, until the precipitate that is first formed is just dissolved; about 25 to 40 c.c.s. (1 oz. more or less) will be required of a solution made by very cautiously dissolving about 75 gms. (2½ ozs.) in 100 c.c.s. (3 ozs.) of water. If just the right amount of caustic alkali is used the solution will remain light in colour and show excellent keeping quality.

The solution should be stored in a brown glass bottle, with a cork or rubber bung.

For a working solution the stock should be diluted with from ten to thirty parts of water, and the temperature should be about 18° C. (65° F.) for best results.

Following are some of the concentrations which are recommended.

For Negatives.—Under-exposed, dilute with from 25 to 30 volumes of water : correct exposures, dilute with 20 volumes : over-exposures, dilute with 10-15 parts and also add ½ c.c. (10 drops) of a 10 per cent. potassium bromide solution to each 120 c.c.s. (4 ozs.) of working developer. The negatives show excellent detail and good contrast and are absolutely free from stain.

For Chloro-bromide Papers.—Dilute with 20 volumes and also add potassium bromide solution as for over-exposed negatives.

For Bromide Papers.—Dilute with 30 volumes and also add bromide as above.

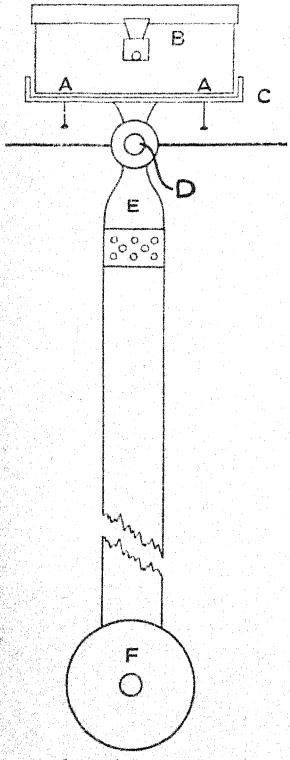
Paraminophenol gives good contrast in strong working solution, while in weaker solution it is rather softer-working. Used for development papers it gives all shades from velvety blue-black in deep shadows to light grey or white in extreme high-lights, and margins that are flawless. It is very sensitive to the action of potassium bromide; therefore it is well to measure rather carefully. With some papers it is possible to get good results by decreasing the bromide by as much as 50 per cent.—Amer. Phot., 1931, Jan., pp. 24-26.—B.J., 1931, Jan. 9, p. 17.

Diluted Developers Energised.—A peculiar effect bearing on the use of diluted developing solutions has been observed by Dr. Lüppo-Cramer. In the presence of certain dyes in very small quantity, or of certain neutral salts in considerable quantity, a dilute developer acquires almost the full activity of a normal, much stronger solution. The sensitometric experiments which led to this observation were made with an emulsion of very steep gradation of the kind used for "document" paper, and with an alkaline hydroquinone developer used at only a quarter the normal working strength. It was found that if the stock solution were diluted with a 10 per cent. solution of potassium nitrate, instead of with water in the usual way, there was an enormous increase in the activity of the developer.

Even more striking was the effect of Pinacryptol Green. If the dilute developing solution is given a 5 per cent. addition of a 1 : 1,000 Pinacryptol Green solution, the resulting solution is almost identical in activity with the normal dye-free developing solution of four times the concentration.—Phot. Korresp, 1930, Oct., pp. 253-256.—B.J., 1931, Jan. 2, p. 1.

Tank Development.—John Erith, as the result of using tank development exclusively in his professional business, recommends the use of thick porcelain tanks, each taking twelve negatives. The developer is kept as a stock solution, which is poured into the tank in the required quantity, and warm water then slowly added, so that the tank and the developer are brought up to the standard temperature of 68° F. If this is done, the fall in temperature during development is very slight. It may be made still smaller by putting the tank in a wooden box well lined with thick felt so that the tank fits tightly in the felt padding.—B.J., 1931, Mar. 6, p. 144.

Rocking in Tank Development.—For keeping the developing solution in constant movement R. V. Dent has used a table (for the tank) rocked by a pendulum, made from a motorcar fan.



A motorcar fan running on ball bearings fore and aft was obtained from a "junk" car shop to serve this purpose. The top and bottom blades were hammered out flat, and the intervening blades on each side were cut off flush with the hub. The top blade was then bent over at right angles and a board C attached, with small projections to prevent the tank B from slipping off. The bottom blade E was trimmed square and affixed to a strip of wood, about four feet long, and two five-pound weights F attached. The apparatus was completed with two stop nails A to prevent the tank from swinging too far. The ball bearing spindle D, projecting behind the fan, was rigidly screwed down with a piece of curved metal, to afford a strong axle to fix the whole contrivance.

The tank rocks steadily for 2½ mins. at a time without a further touch of the pendulum, and the resulting negatives are absolutely free from streaks or any other sign of uneven development. As a further precaution the tank may be occasionally reversed during the period of development.—B.J., 1931, July 31, p. 452.

Preventing Developer Stain.—As a means of preventing staining of the fingers with developer, L. G. Mason recommends rubbing "Vanguard" Boractholene into the finger tips and over the nails before putting the fingers into the developer. The preparation in no way harms any sensitive surface.—B.J., 1931, July 31, p. 464.

Pyro-Metol Fine-grain Developer.—For producing images of reduced granularity on cine-films used in miniature still cameras, the following developer has been strongly recommended :—

A.	Oxalic acid	0·4 gms.	18 grs.
	Metol	4 gms.	175 grs.
	Pyrogallic acid ...	12 gms.	1 oz. 88 grs.
	Potass. metabisulphite	1 gm.	44 grs.
	Water	200 c.c.s.	20 ozs.
B.	Sodium sulphite, cryst.	48 gms.	5¾ ozs.
	Water	168 c.c.s.	20 ozs.
C.	Acetone	40 c.c.s.	4 ozs.
	Water	200 c.c.s.	20 ozs.

To make the working solution 15 parts of each solution are mixed with 80 parts of water.—Rev. Fr., Phot., 1931, September 1, p. 270.

Variable M.-Q. Developer.—Emphasising the practical advantage of being able to vary the components of an M.-Q. developer according to particular purposes, Dr. A. Lichtenberg recommends the following three-solution method of compounding metol-hydroquinone developers :—

A.	Sodium sulphite ...	150 gms.	3 ozs.
	Hydroquinone ...	15 gms.	130 grs.
	Water	1,000 c.c.s.	20 ozs.
B.	Metol	15 gms.	130 grs.
	Sodium sulphite ...	150 gms.	3 ozs.
	Water	1,000 c.c.s.	20 ozs.
C.	Potass. carbonate ...	200 gms.	4 ozs.
	Water	1,000 c.c.s.	20 ozs.

These may be mixed as desired, but generally the quantity of alkali solution C should be half the total of the developer solutions A and B. For example, if 3 ozs. of A and 1 oz. of B are taken, the amount of C should be one-half of 3 plus 1 oz. or 2 ozs.

A normal developer is made up with A, 1 part ; B, 1 part ; C, 1 part ; water, 1 part. To the mixture 5-10 drops of 10 per cent. potassium bromide solution are added per 100 c.c.s. (or per 4 ozs.).

For softer negatives, increase the amounts of solutions B and C and of water, and decrease the amounts of solution A and of bromide. Vice versa, for more vigorous negatives.

For under-exposed plates take A, 1 part ; B, 10 parts ; C, 7 parts ; water, 20-40 parts.

For over-exposed plates take A, 10 parts; B, 1 part; C, 2 parts; and add 20-30 drops of bromide solution per 100 c.c.s. (or per 4 ozs.).—Phot. Rund., 1931, August, pp. 317-318.

Development in Hot Climates.—For avoiding the occurrence of fog, when development is carried out at temperatures above 77° F., the use of paramido-phenol accelerated with an alkali carbonate is specially suitable. The following formula is recommended :—

Soda sulphite, anhyd. ...	50 gms.	1 oz.
Soda carbonate, anhyd. ...	50 gms.	1 oz.
Paramido-phenol chloride...	7 gms.	60 grs.
Soda sulphate, cryst. ...	100 gms.	2 ozs.
Water to make	1,000 c.c.s.	20 ozs.

The soda sulphate is added for the purpose of preventing excessive swelling of the gelatine in contact with the warm developing liquid. The amount indicated eliminates all risk of accident of this kind when the temperature does not exceed 86° F. At higher temperatures, up to 95° F., it is wise to double the quantity of sodium sulphate and add a small amount of potassium bromide.—Le Phot., 1931, August 5, p. 301.

DEVELOPER FOR D. AND P. WORKS.

Kodak D.75 Tank Formula.—The Kodak Company has worked out a new developer (D75) for D. and P. works, specially suitable for Verichrome film and equally so for ordinary film. The formula is found to be distinctly superior in retaining its strength while the first few batches are developed, whilst by addition of the strengthener, "D75A," its life is prolonged to a remarkable extent.

KODAK VERTICAL TANK DEVELOPER.

	10 gallons.	20 gallons.	40 gallons.
Solution I.			
Water (125° F.)	1 gall.	2 galls.	4 galls.
Elon	1¼ ozs.	2½ ozs.	5 ozs.
Solution II.			
Water (125° F.)	1 gall	2 galls.	4 galls.
Soda sulphite (cryst.) ...	1 lb.	2 lbs.	4 lbs.
Sodium bisulphite ...	15 ozs.	1 lb. 14 ozs.	3¾ lbs.
Solution III.			
Water (160° F.)	1 gall.	2 galls.	4 galls.
Soda sulphite (cryst.) ...	14 ozs.	1¾ lbs.	3½ lbs.
Hydroquinone	5 ozs.	10 ozs.	1¼ lbs.
Pyro	1¼ ozs.	2½ ozs.	5 ozs.

Solution IV.

Water (125° F.) ...	...	1 gall.	2 galls.	4 galls.
Soda carbonate (cryst) ...		5 lbs.	10 lbs.	20 lbs.

Make up to 10, 20 or 40 gallons respectively with cold water.

To obtain the full "quality" and "life" from D.75 the developer must be mixed as follows. Four solutions should be prepared as indicated. Use enamel or earthenware containers for the preparation of the solutions. *If galvanised buckets or containers are used in any way, chemical fog and veiling of the films will result.*

Pour 2 gallons of water into the perfectly clean tank. Make Solution No. 1 and add to water in tank. Stir well. Make Solution No. 2 and add to tank. Stir well. Continue in the same way with Solution No. 3 and then No. 4. Finally, fill up to 10, 20 or 40 gallons and stir well. Leave for one hour before use. Ideal temperature, 68° F. Starting time of development, 10 minutes. The temperature should be kept at 68°. Do not use below 65° or above 70°. Allow one minute variation in time for each degree above or below 68°, i.e., 8 mins. at 70°, 13 mins. at 65°. Local conditions may call for adjustment of standard times. Check negative quality constantly and adjust time as required.

FORMULA D.75A.

KODAK VERTICAL TANK DEVELOPER STRENGTHENER.

	1 gallon.	2 gallons.	4 gallons.
Water (125° F.)	½ gall.	1 gall.	2 galls.
Elon	275 grs.	1¼ ozs.	2½ ozs.
Soda sulphite (cryst.) ...	7½ ozs.	15 ozs.	1 lb. 14 ozs.
Sodium bisulphite ...	3¾ ozs.	7½ ozs.	15 ozs.
Hydroquinone	1¼ ozs.	2½ ozs.	5 ozs.
Soda carbonate (cryst.)...	1 lb. 11 ozs.	3 lbs. 6 ozs.	6¾ lbs.
Water to make	1 gall.	2 galls.	4 galls.

This stock strengthening solution should be used 1 part to 1 part water for bringing developer to original volume.

Mix as follows: Having thoroughly cleaned the earthenware or glass container, pour into it the necessary quantity of clean, warm water (125° F.). Add the elon to the water, and thoroughly dissolve. Continue with the other chemicals in the order named, making sure that each chemical is thoroughly dissolved before adding the next. Finally add water to make up quantity and stir well.—B.J., 1931, Aug. 7, p. 474.

DEVELOPMENT AND SUBJECT.

Timing Development to Suit Subject Contrast.—A system of development timing which takes account of differences in the range of tones present in the original subject has been described by M. Bernard.

Four classes of subjects are distinguished for this purpose :—

A. Subjects with exceptional contrasts, of the order of 100 to 1.

B. Subjects with strong contrasts, about 40 to 1.

C. Normal subjects, about 20 to 1.

D. Subjects with low contrast, of the order of 10 to 1.

Interior subjects are usually of class A, especially when windows are included or when dark furniture and bright surfaces are present together. In many interiors the contrasts much exceed 100 to 1, and in these cases the range generally exceeds the scale of the emulsion.

Posed portraits in which dark clothing and light features are both included fall within classes A. or B. Open-air groups, on the other hand, belong rather to classes C. or B.

Landscapes with foregrounds are usually of class C., unless heavy foliage and well lit, sunny patches are present, when the subject will be of class B.

Copying work generally means class D, but each case needs to be judged on its merits, e.g., whether a black-and-white original or a painting.

Very open landscapes, panoramas and aerial views almost always come under class D. Mist always decreases contrast, while sunshine increases it. Mountain landscapes with very clear distance and with fir forests are an exception : these are much more likely to correspond with class C.

Against-the-light effects, scenes under trees and similar subjects must be placed in class B. or A.

Moreover, three qualities of negatives may conveniently be allowed for, viz. :—

(*a*) Strong negatives suitable for "soft" papers of scale 1·4 or 1·5.

(*b*) Medium negatives, for "normal" papers of scale 1·2 or 1·3.

(*c*) Soft negatives, for "contrast" papers of scale 0·9 to 1·1.

It should be noted that even the most vigorous type of negative here considered is considerably less harsh in its contrasts than the negatives often favoured by amateurs.

Negatives of type *a* are, however, the strongest which can conveniently be used for printing on paper: in fact, even this is recommended only for the making of very warm-toned transparencies. Type *c* is best suited for condenser enlargers. The intermediate type *b* is the most generally useful for various printing processes.

The metol-hydroquinone developer recommended by the plate maker is prescribed, but an addition to the normal formula is provided, in the form of a diluted bath containing potass bromide in unchanged amount for a given total volume, but with all other constituents reduced to half-strength. In the following table the full-strength developer is represented by N, and the diluted bath by N/2. The table indicates when each form of developer is to be used.

The table is based on a developing temperature of 62·5° F. Correction for other temperatures can be made by allowing the following times for each minute specified at this temperature:—

1 min. 5 secs. at 61° F.
55 secs. at 64·5° F.
51 secs. at 66° F.
47 secs. at 68° F.

In the case of a particular plate, which is classified as "normal" under the Burroughs-Wellcome developing system, the following recommendations for development times are set forth:—

NEGATIVE TYPES.

Subject.	*a*	*b*	*c*
A	3 min. 10 secs. (N/2)	2 min. 40 secs. (N/2)	—
B	3 min. 50 secs. (N/2)	3 min. 20 secs. (N/2)	2 min. 50 secs. (N/2
C	4 min. 10 secs. (N/2)	3 min. 45 secs. (N/2)	3 min. (N/2)
D	4 min. 15 secs. (N)	3 min. 40 secs. (N)	3 min. 10 secs. (N)

The developer in this instance is of formula:—

A.	Metol	4 gms.	35 grs.
	Hydroquinone	7 gms.	60 grs.
	Soda sulphite (anhyd) ...	40 gms.	350 grs.
	Water to make	1,000 c.c.s.	20 ozs.
B.	Soda carbonate (anhyd.) ...	30 gms.	265 grs.
	Water to make	1,000 c.c.s.	20 ozs.
C.	Potass. bromide (10 per cent. solution).		

Developer N:
2 ozs. A + 2 ozs. B + 12 drops of C.
Developer N/2:
1 oz. A + 1 oz. B + 2 ozs. water + 12 drops of C.

It is emphasised that this method needs adaptation for individual emulsions, and will only give the anticipated quality

of negative if the exposure has been close to the minimum correct exposure. An exposure much below this will give decreased contrast in the negative; exposures exceeding this will give first increasing contrast, rising to a maximum and then falling, with increasing prolongation of the exposure.—Photo-Rev., 1931, May 1, pp. 129-131.

FIXING.

Acid Baths with Stock Solutions.—A convenient way of modifying the acid fixing bath according to the purpose for which it is to be used consists in the use of the following two stock solutions :—

A.	Liquid sodium bisulphite or Potass. metabisulphite (cryst.)	100 c.c.s. 45 gms.	2 ozs. 400 grs.
	Hypo	600 gms.	12 ozs.
	Cold water, to make ...	1,000 c.c.s.	20 ozs.
B.	Powdered chrome alum ...	20 gms.	175 grs.
	Luke-warm water, to make	1,000 c.c.s.	20 ozs.

For fixing negatives dilute 1 volume of solution A with 1 volume of water, *i.e.*, equal volumes of the solution and of water. If hardening effect is also desired, mix 1 volume of A with 1 volume of B.

For prints or lantern slides dilute 1 volume of A with 2 volumes of water. If a hardening bath is wanted, mix 1 volume of A, 1 volume of B and 1 volume of water.

This method retards the decomposition of the hypo by chrome alum and gives the best efficiency.—Rev. Fr. Phot., 1930, Nov. 1, p. 328.

Clean Negatives.—The factors in fixing and washing which are chiefly effective in ensuring clean negatives with a smooth, shiny surface have been emphasised by R. R. Rawkins.

Where the water is hard, an acid fixing bath is necessary to ensure a clean surface. Alum, however, is best avoided. Nothing more is needed (in the British Isles) than a solution of 5 ozs. hypo to the 20 ozs. water, with half an ounce of potass. metabisulphite. The washed negatives should be wiped over with a soft cloth or wash leather, and where the water is very hard this cloth may be dipped occasionally in a 1 in 100 solution of hydrochloric acid. One method which has been practised successfully is to take the tank of washed negatives from the last wash water, immerse for

a few minutes in a tank of 1 per cent. acetic or hydrochloric acid solution and then put straight away to drain and dry.

The disadvantage of a bad-surfaced negative is that it gives a pronounced grain on enlarging. A negative that is faulty in this respect may be much improved, by a very short immersion in a fairly weak hypo-ferricyanide reducer (not long enough for any reduction to occur, unless desired): it will often then dry with quite a glossy surface. Alternately the surface may be polished with the "Frictol" abrasive preparation of the Vanguard Company. Other methods are to varnish the negative or rub a little petroleum jelly over the surface. Varnishing with cold celluloid varnish is strongly recommended for the protection of negatives.—B.J., 1931, Jan. 30, pp. 60-61.

FOR IMPROVEMENT OF NEGATIVES.

Slight Intensification.—A very good way of giving a negative a slight increase of printing quality is first of all to intensify it as far as it will go, in the mercury-iodide intensifier, and, after a short wash, to put it into a clean hypo bath. Theoretically this should remove the added density, but in practice this is rarely removed altogether, and the result is that the negative has gained in strength, though only to a slight amount, throughout its scale of tones. If at that stage, after sufficient washing to remove the hypo, the negative be dried off in a methylated spirit bath, followed by application of warmth, a further definite addition to the printing density will result, in the same way as a newly-developed plate gains in strength on rapid drying.—B.J., 1931, April 10, p. 205.

Extreme Intensification.—For obtaining any degree of density from negatives of the thinnest kind and at the same time securing permanent results, Henry W. Bennett strongly recommends the process in which the negative is bleached with mercury bichloride and re-developed, repeating this procedure as many times as necessary.

The bleaching solution is :—

Mercury bichloride	200 grs.	23 gms.
Water...	20 ozs.	1,000 c.c.s.

The bleached negative is passed through three successive of weak hydrochloric acid, viz. :—

Hydrochloric acid, conc. ...	1 dram.	10 c.c.s.
Water...	12 ozs.	1,000 c.c.s.

It is then washed for a few minutes in running water and

re-developed in any non-staining developer. In this way the intensification can be repeated six times or more, and the merest ghost of an image thus brought to printing density. —B.J., 1931, July 10, pp. 405-407.

Reducing Harsh Negatives.—An an alternative to persulphate and permanganate reducers for harsh negatives with weak shadow detail the method of re-halogenising and partially re-developing the image is frequently advised. The following modification of the method usually described is recommended:—

Common salt	37·5 gms.	¾ ozs.
Copper sulphate	12·5 gms.	¼ oz.
Water	1,000 c.c.s.	20 ozs.

A bleaching solution is made up according to the above formula. A freshly made negative will bleach completely in from 2-4 mins. With an old negative in which the gelatine has probably hardened and become greasy from handling, it is necessary to prepare the negative for bleaching by soaking for several hours, during which time it is given one immersion in weak sodium carbonate solution and a short immersion in acetic acid solution.

The negative will bleach out to a white colour, with a brownish hue by transmitted light. It is important that the bleaching should be complete, so that the image shows quite white from the back. The negative is then quickly rinsed and lightly rubbed with wet cotton wool. All the treatment so far is carried out by fairly weak artificial light, but the bleached negative must next be exposed for a few minutes to daylight or an electric bulb of 60-100 watts. It is then placed in a very dilute developer, of any kind, in which it slowly re-blackens, first superficially, then deeper in the film.—Phot. Rund., 1931, October, pp. 371-372.

Reducing by Re-halogenising.— Stuart Black recommends the following modification of the re-halogenising process as being simple and more reliable :—

Bleaching is carried out by means of a mixture of 10 per cent. potassium ferricyanide solution and 10 per cent. potassium bromide solution. The mixture is made in about equal proportions, though the exact ratio is not important. In this the negatives, which must be free from hypo, are immersed, wet or dry, and left to bleach completely. This rarely takes more than three or four minutes. The bleached negative is then washed for about ten minutes.

The image is re-developed in a weak non-staining developer consisting, for example, of an M.Q. mixture diluted to a quarter the normal working strength. In this the image comes up gradually—at first very unevenly, then evening up and darkening.

The success of the method depends on knowing when to stop. The great risk is of stopping too soon. The negative loses quite a good deal in the fixing bath, and the best way of judging is to watch the appearance at the back and wait till this looks like a rather faint "tintype" from a while-you-wait camera. Then rinse the plate and transfer to the fixing bath. Five minutes' fixing and a thorough washing follow.

The final contrast in the image seems to be inversely proportional to the strength of the developer. A very strong developer leaves the negative unexpectedly thin when finished, though it may have looked amply dense by transmitted light. Hence a dilute developer is preferable.

This method is so satisfactory that Stuart Black has adopted it as the basis for a method of development of holiday exposures when travelling, when facilities for timing were not to hand. The plates are simply developed in a daylight tank for a time known to be grossly excessive, fixed and washed. On return, the plates are all bleached and re-developed in full daylight, by the process described, so that the required degree of contrast is obtained.—A. P., 1931, March 11, pp. 200-201.

Removing Drying Marks.—For removing drying marks caused by uneven drying of a negative, or "tear marks" caused by a drop of water falling on a dry negative, L. G. Sandys finds bleaching and re-developing a perfectly effective treatment.

For bleaching, a ferricyanide solution as used for sulphide toning is recommended, viz.:—

Potass. ferricyanide	4 ozs.
Potass. bromide	4 ozs.
Water...	80 ozs.

Re-development with ordinary developer then follows.—B.J., 1931, Jan. 9, p. 21.

Blocking-out with Water Colour.—When blocking-out needs to be done on negatives, as in the blocking-out of backgrounds, the most satisfactory medium, according to H. W. Bennett, is Indian red water-colour, in the form of moist colour supplied in tubes (students' quality). Large masses

of transparent or semi-transparent background in a negative may be covered with sufficient opacity to yield a pure white ground in the print, and there is no risk of the colour cracking or peeling off.

A great advantage possessed by this water-colour is that it can be easily removed by soaking the plate in water for a few minutes and then gently sponging the surface. If the colour is washed off within a few days, or even a week or two, it should leave no trace. But if left on the plate for a year or more a difference will be seen in those parts of the plate which have been covered by the colour.—B.J., 1931, Feb. 20, p. 104.

Cleaning Films from Old Negatives.—Though the usual method of cleaning the gelatine film from a glass plate by dipping in very hot caustic soda solution is rapid and effective, it is liable to leave the glass with a slight permanent opalescence. After a dip in the hot soda solution the gelatine coating can be almost instantaneously scrubbed off with a stiff brush, but a method which is free from this objection is the use of a solution of acid ammonium fluoride, made by dissolving a teaspoonful of this salt in about seven ounces of water. After a few seconds in this solution the emulsion film begins to detach itself and can be pulled off in a single piece, leaving the glass perfectly clean. The quantity of solution named above has been found to be sufficient for removing the films from about 150 quarter-plate negatives. The method is not applicable to the removal of the emulsion from film negatives.—B.J., 1930, Dec. 5, p. 729.

Stripping a Film by Heat.—A well-known method of stripping the film from a glass negative consists in impregnating the film with an alkaline hardening solution, drying and then immersing in an acid solution: the separation of the gelatine film then follows as the result of the formation of carbon dioxide under the film.

A variant of this process has been described in which the separation comes about by heat. The negative is hardened in the following bath:—

Formaline	300 c.c.s.
Glycerine	40 c.c.s.
Water to make	1,000 c.c.s.

If the negative is treated before drying, 60-90 seconds' immersion will be sufficient: if it is dry, twenty minutes is advisable.



A SPANISH GIRL JOHN ERITH



ENID STAMP-TAYLOR

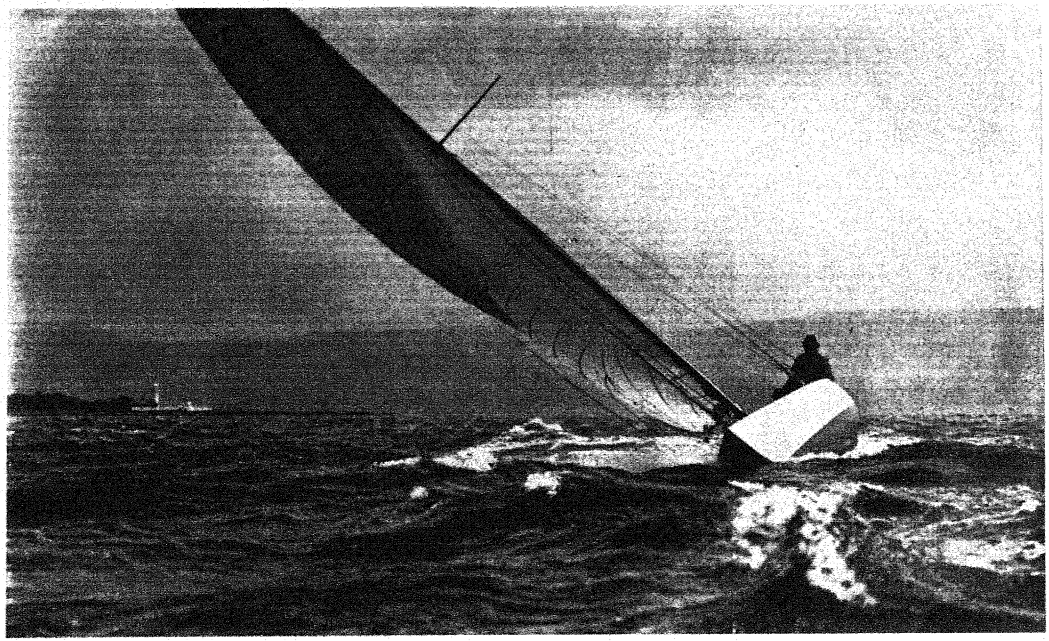
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THE RACER

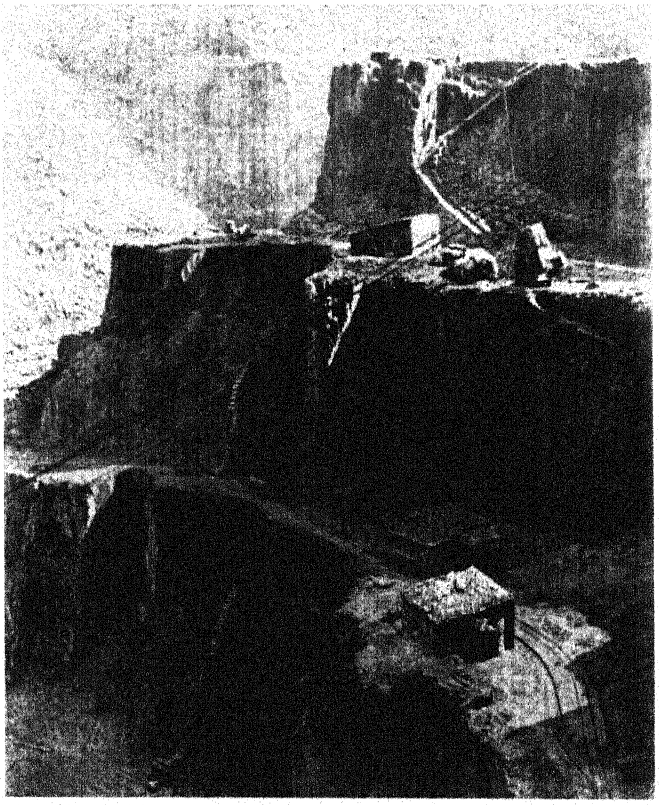
CHARLES WORMALD

By courtesy of the H. K. McCann Co. Ltd.

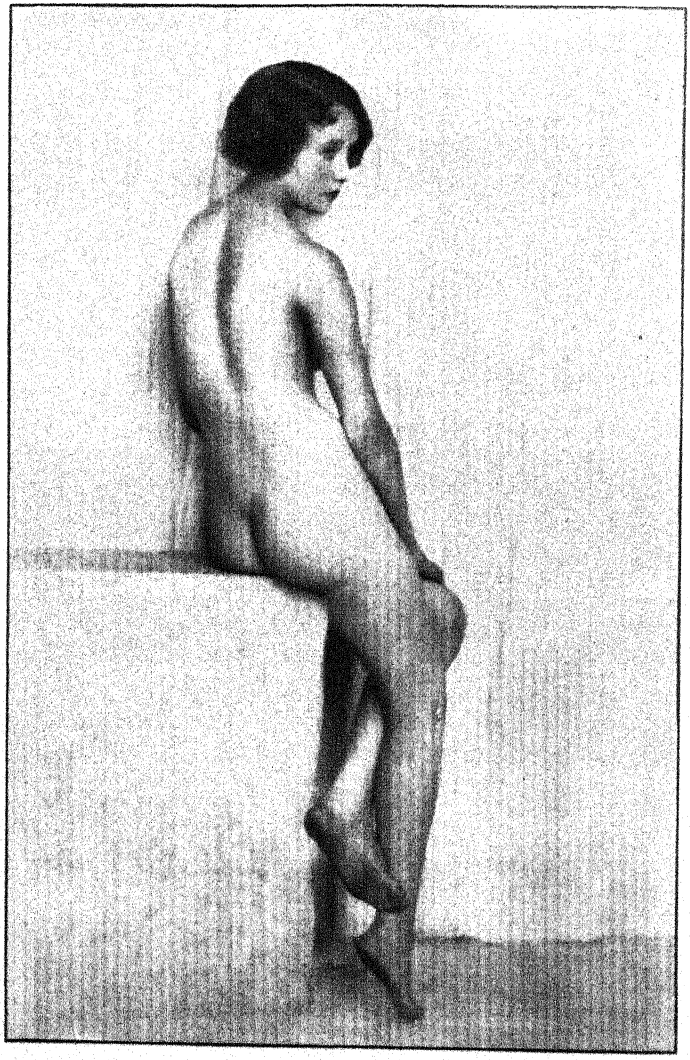


A FRESH WIND

G. L. A. BLAIR

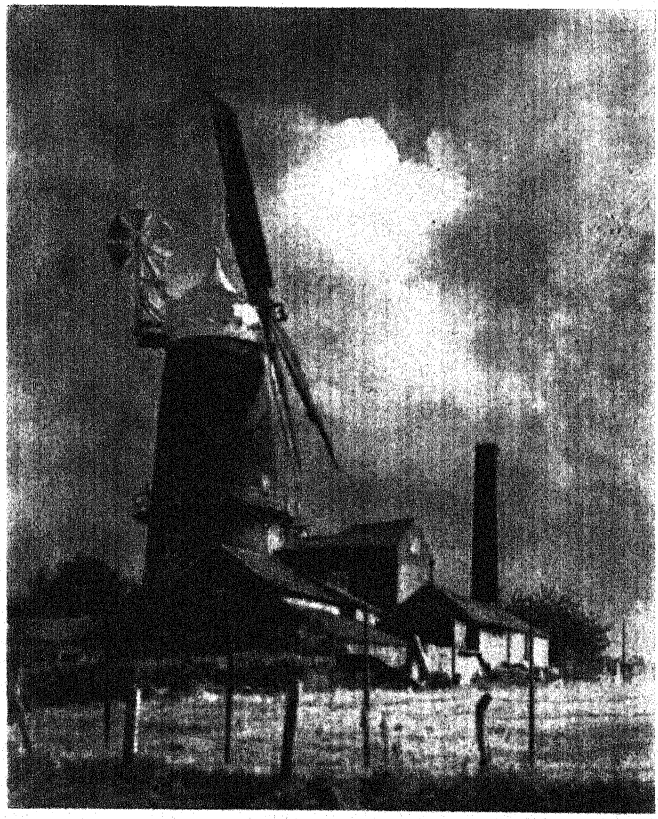


A CASTLE IN SLATE, BETHESDA — HERBERT BAIRSTOW



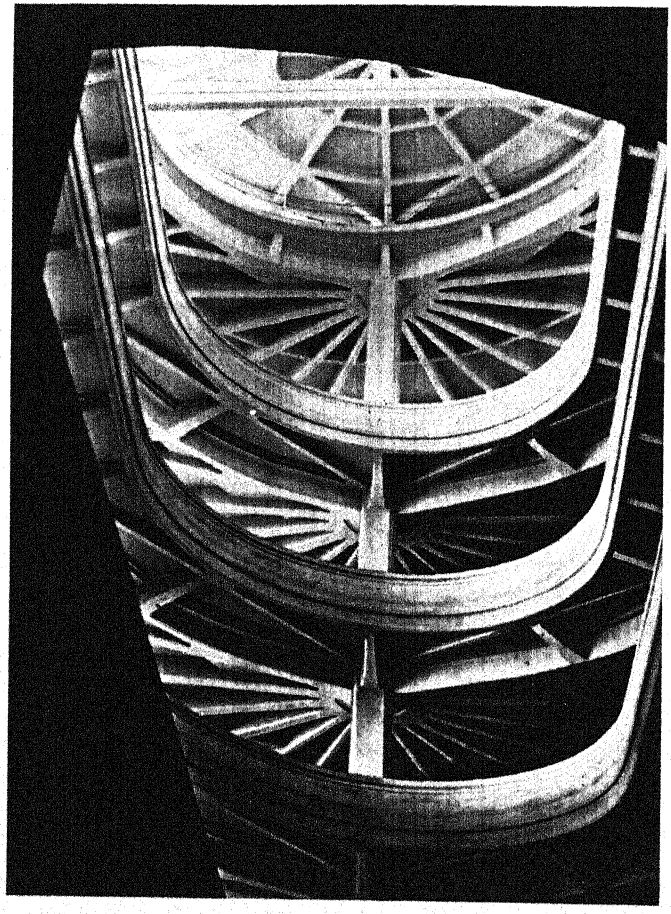
THE MODEL

A. KEITH DANNATT

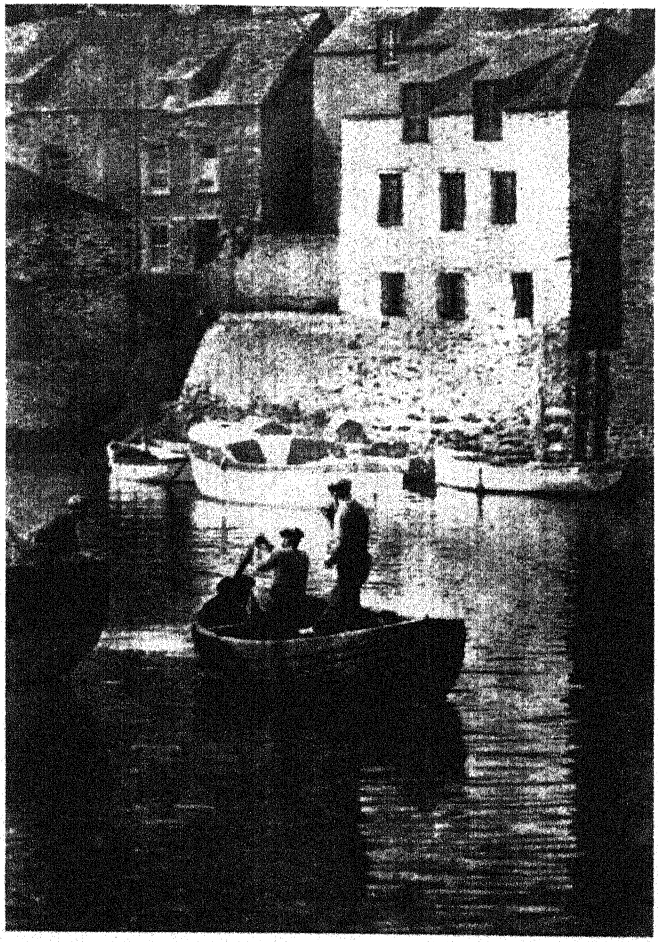


DENHAM MILL

RONALD BEAUCHAMP



FIAT WORKS II, TURIN — STEFANO BRICARELLI



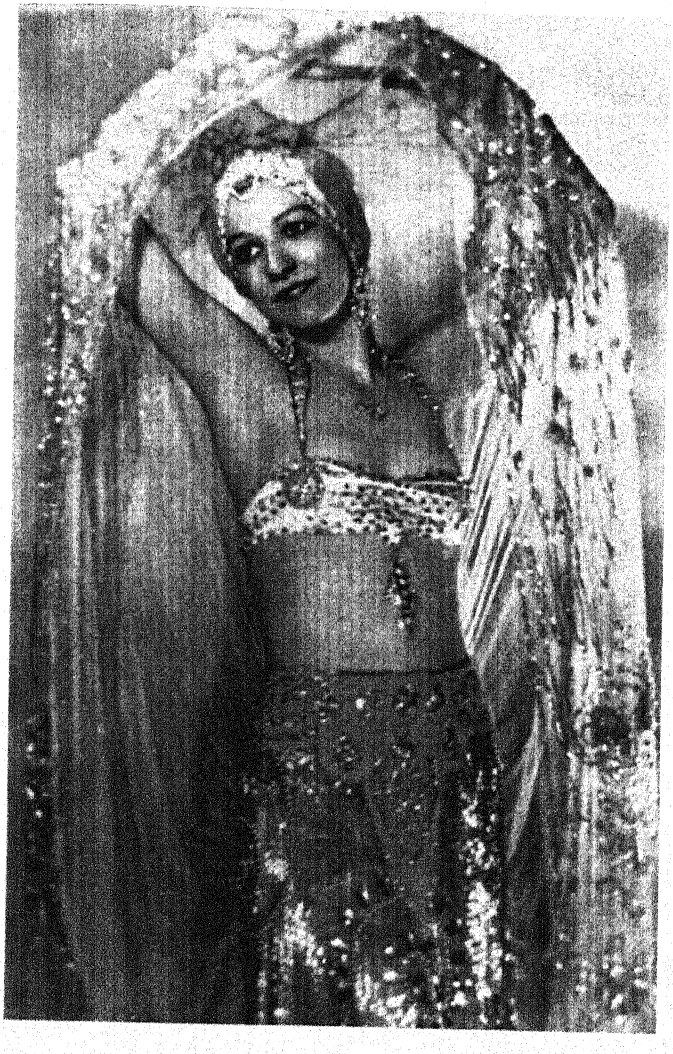
IN HARBOUR

G. L. HAWKINS



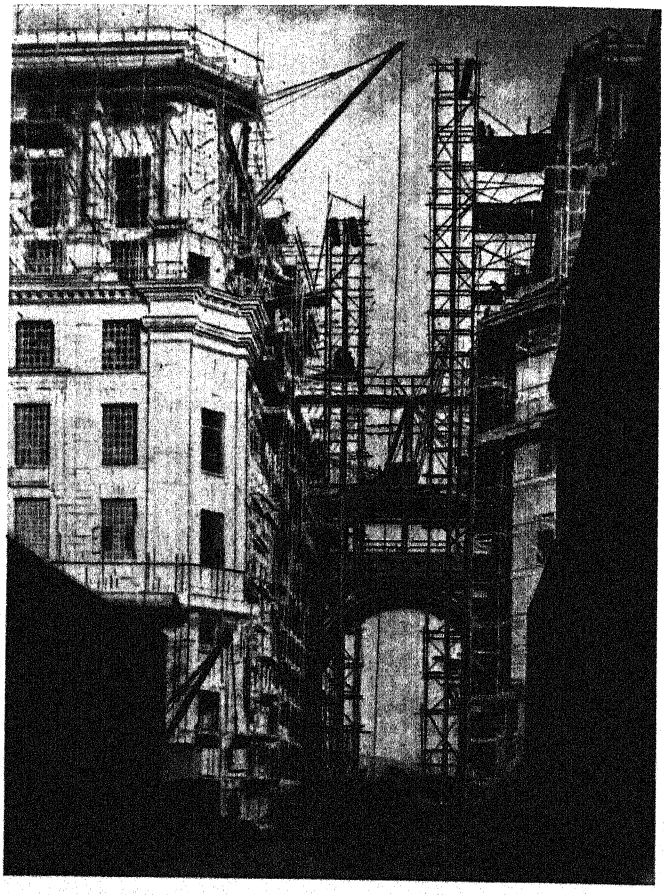
GRETCHEN

WALDEN HAMMOND

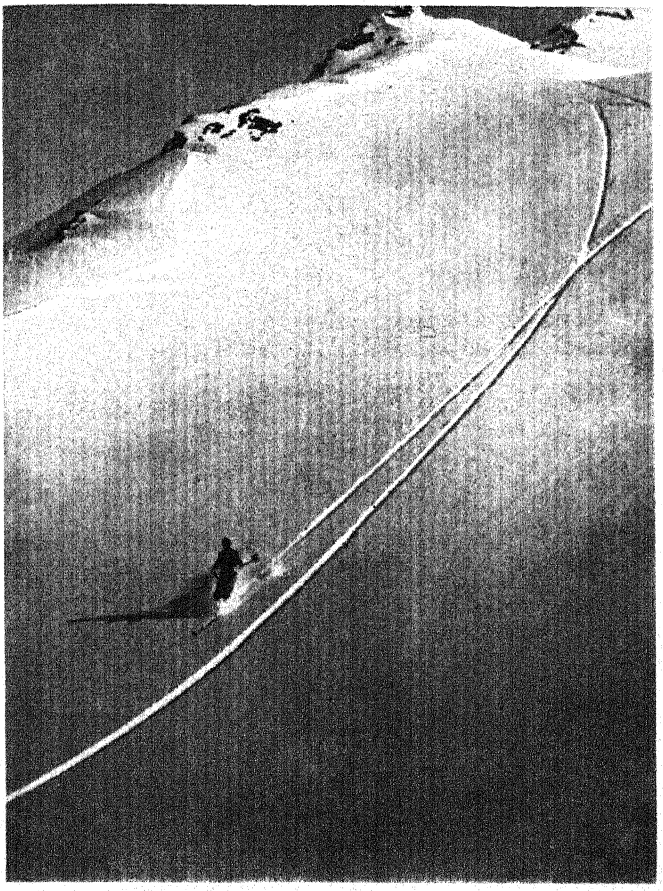


ORIENTALE

CHAS. CLAYTON, JR.

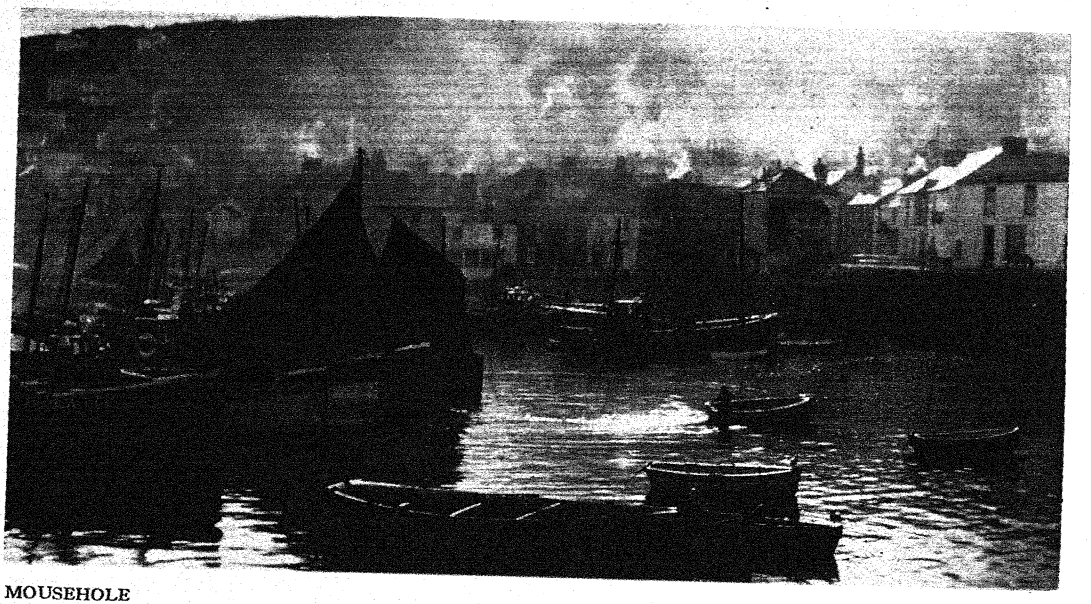


BUILDING OPERATIONS J. H. ANDERSON



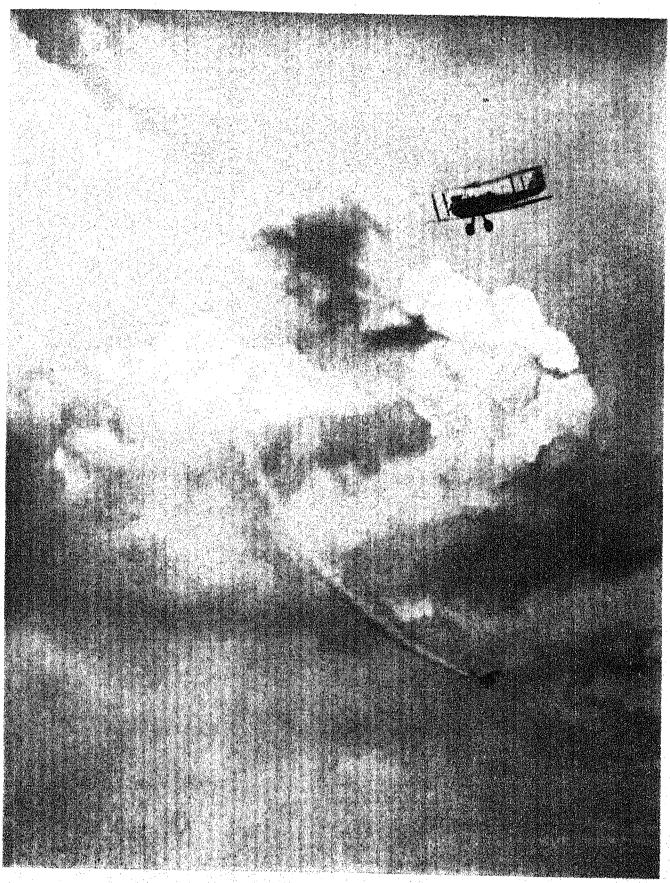
LA SCIA

CESARE GIULIO



MOUSEHOLE

O. F. BUTLER



THE SHAM FIGHT

A. L. HITCHIN



SMILING IRISH EYES — ALICE ARMSTRONG

When removed, the negative is dried. It is then given two coats of celluloid varnish (celluloid dissolved in butyl acetate). When the varnish is thoroughly dry the film is cut through to the glass round the edges and gently warmed on an iron plate. At a moderate temperature it will be found possible to lift the varnish film by one corner and strip it with the film from the glass. For better preservation the film is finally varnished on the other side.—Rev. Fr., Pho., 1931, October 1, p. 302.

PAPER NEGATIVES FOR PICTORIALISTS.

Pictorial Control via Copy Negatives.—For producing from an ordinary film or plate negative a pictorial print retouched or " controlled " according to the taste of its author, Dr. E. P. Wightman recommends the intermediate use of a paper copy negative, in one or other of the following ways.

The Paper-Positive Paper-Negative Method.

From the original negative an enlargement is made on single-weight paper suited to the contrast of the subject and the negative, with or without diffusion. Papers such as Eastman P.M.C. No. 1, Kodak Velvet bromide or Kodaline are suitable, for example, when normal, soft or vigorous contrast respectively is desired. The developer should also be modified for further control of contrast, if necessary, by using contrast developer or M.Q. with plenty of bromide to accentuate contrast, and a metol developer or M.Q. developer rich in metol for softness of contrast.

To minimise graininess arising from the texture of the base, both this enlargement and the paper negative subsequently made should be placed on the enlarging easel with the uncoated face outwards, the exposure being made through the paper base. The resulting image, viewed as a transparency, will show excellent smoothness of gradation. To avoid lateral inversion in the final print, the negative must be reversed in making this enlargement. Both the enlargement and the paper negative must be slightly over-exposed and over-developed, by the customary standards of print making.

The paper positive is next placed face downwards on an illuminated ground-glass, and is worked up on the back with soft pencil or chamois stump dipped in powdered charcoal.

From this positive print a trial paper negative is made by printing, by contact or enlargement on another thin paper, for example, Eastman P.M.C. No. 2, Kodak Velvet bromide or Kodaline. This is similarly prepared and worked

up on the back, ready for final printing by contact. Oiling of the paper negative, as a means of increasing its transparency, is not recommended.

The Film-Positive Paper-Negative Method.

This differs from the foregoing in the use of an enlarged film positive in the first operation. Eastman Commercial or Par-Speed Portrait film serves excellently. To facilitate retouching, a piece of tracing paper or matt film is cemented at the edges to the back of the film positive, using tape, glue or film cement. This second method is preferable, as a finer smoothness of gradation is possible with the film positive.—Amer. Phot., 1931, Jan., pp. 28-36.—B.J. 1931, Jan. 23, pp. 47-49.

BROMIDE PRINTING.

Avoiding Stress Marks.—For papers that are apt to produce stress marks R. Garriga recommends a two-bath method of development. The normal developer consists of :—

Metol	2·5 gms.	22 grs.
Hydroquinone	5 gms.	44 grs.
Soda sulphite, anhydrous ...	25 gms.	½ oz.
Soda carbonate	30 gms.	260 grs.
Potass. bromide	1 gm.	9 grs.
Water...	1,000 c.c.s.	20 oz.

In the development of prints the papers are first placed in a solution compounded by mixing five parts of the above developer, five parts of water and one part of 10 per cent. hypo solution. In this mixture prints remain until the appearance of the first traces of the image, whereupon they are removed to a dish of normal developer and completed there.—B.J., 1930, Oct. 10, pp. 605-606.

Clearing Yellow Stains.—In preference to the acid alum bath for clearing stained bromide prints B.P. Cahill recommends a permanganate bath.

The first bath is composed of ordinary tap water with sufficient potass. permanganate added to stain it deep crimson. (The bottom of a white dish should be just visible.) The print is placed in this after being well washed from hypo, and is left for about a minute or until the whites take on a deep brown shade. It is then transferred to a bath of 5 per cent. potass. metabisulphite, when the brown stain left by the permanganate immediately disappears, leaving

the print clean, when it should be well washed again, and toning may be proceeded with.

This treatment can also be applied to collodio-chloride self-toning prints, either to reduce over-harsh prints or to take out portions of the picture entirely. The print may either be reduced generally or merely locally by applying the permanganate solution on a piece of cotton wool.—B.J., 1931, Mar. 20, p. 175.

P.O.P. Quality by Two-stage Development.—It is admitted that prints made on development paper are inferior to P.O.P. prints in the quality of tone reproduction which is obtainable, particularly in the rendering of gradation in the lighter tones. This quality of a P.O.P. print results from the fact that its characteristic curve differs from that of any development paper as customarily used.

Dr. Felix Formstecher has found, however, that a contrasty gaslight paper exhibits this form of characteristic curve when it is treated by a special method of two-stage development. Hence development prints reproducing the quality hitherto peculiar to P.O.P. prints can now be made in this way. The paper with which the author has obtained these successful results is Mimosa Sunotype Extra Hard.

The principle of this method is to separate the constituents of a normal developer into two baths in which the print is given successive immersions. The first is a dilute developer, made up from the two following stock solutions :—

I.—Metol	14 gms.	120 grs.
Soda sulphite, anhyd. ...	70 gms.	610 grs.
Distilled water	1,000 c.c.s.	20 grs.
II.—Hydroquinone	17 gms.	150 grs.
Soda sulphite, anhyd. ...	50 gms.	1 oz.
Distilled water	1,000 c.c.s.	20 ozs.

The working solution A is made up, just before use, by mixing 1 part of solution I, 1 part of solution II, and 6 parts of distilled water.

The second developing solution B is :—

Soda carbonate, anhyd. ...	56 gms.	490 grs.
Potass. bromide	1 gm.	9 grs.
Distilled water	1,000 c.c.s.	20 ozs.

(This solution keeps indefinitely.)

The working temperature is 68° F. (20° C.). The paper is given the normal exposure, and is then put first in solution A, then in solution B, then for half a minute in a 1 per cent.

bath of acetic acid, and finally is fixed and washed as usual.

The best results are obtained with two minutes' immersion in solution A and at least four minutes in solution B. Treated in this manner the paper gives less contrast and a longer printing scale than in its normal use. Exact exposure is necessary.—Phot. Ind., 1930, Oct. 22, pp. 1152-1154.—B.J., 1931, Jan. 23, pp. 46-47.

Non-stain Bleach for Bromides.—The various solutions for completely bleaching the silver image of a bromide print, for example, after a pen-and-ink sketch has been drawn on it, differ considerably in the ease with which every trace of image—silver or stain—may be removed.

In this respect D. Charles recommends the permanganate-hydrochloric bleacher (as specified by Greenall for toning bromides), as being superior to ferricyanide-bromide, bichromate-hydrochloric, and permanganate-sulphuric bleaching mixtures.

Prints bleached in this solution and then fixed in hypo were found to show no residual image whatever.

Ordinary tincture of iodine, diluted with about five times its volume of water, also bleaches quite satisfactorily, though slowly, and gives equally good results after re-fixing.—B.J., 1931, Mar. 6, p. 136.

Restoring Tarnished Bromides.—The following method of restoring tarnished and yellowed bromide prints is recommended by W. B. Shaw, M.A. :—

The print is re-fixed in a 40 per cent. hypo solution for fifteen minutes, with occasional agitation. *This is imperative*, since any silver compounds present in the film will be rendered immovable by the next operation, and will cause a heavy veil over the high-lights of the finished print.

After being washed free from hypo, the print is bleached in an acid permanganate bath.

To a solution containing 2 parts of strong *hydrochloric* acid in 100 parts of water, sufficient potassium permanganate solution is added to render the liquid a dark port-wine colour. The bath should be made up in this way: the quantity of acid to be added to a permanganate solution must not be guessed.

When bleaching is complete the print is washed for five minutes and then treated with a 5 per cent. sodium bisulphite (or potassium metabisulphite) solution to remove the stain. Then wash for ten minutes and re-develop in amidol—*not* M.Q.

Rinse and fix in 20 per cent. hypo and give final washing. Alum should not be used until the print is free from hypo.

The reason weakly alkaline amidol developer is used is on account of the danger of treating old papers with acid and strongly alkaline baths in succession.—B.J., 1931, October 2, p. 595.

THE GLAZING OF PRINTS.

Thin Chromium Plates.—A correspondent of the B.J. recommends as most satisfactory the method of squeegeeing prints to extra-thin chromium plates (Ensign, Ltd.), and putting these latter through the ordinary rotary drier. Prints fall off after one revolution of the drum. The plates are first washed in water only and put through a rubber wringer. Prints are not hardened further than by use of an acid fixing bath.—B.J., 1931, Aug. 14, p. 490.

Secrets of Perfect Glazing.—The cause of fleck-marks on glazed prints, and the method for obtaining a perfect glaze, have been described by O. J. Morris.

Fleck-marks—unglazed patches in the form of small spots—are the result of air-pockets between the print and the glass or ferrotype and are due solely to faulty procedure. The conditions for their avoidance are as follow:—

(1) Perfect glazing depends on perfect contact between the print and the glass or ferrotype.

(2) Perfect contact between two surfaces cannot occur while any air remains between them.

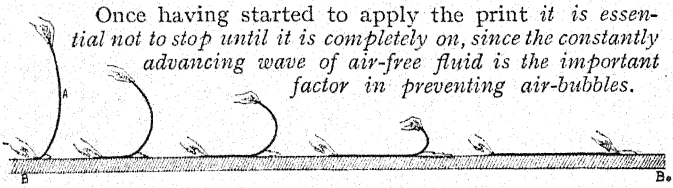
(3) Perfect contact can be obtained only at the actual moment of contact between print and support.

In practice, the first point is that, to prevent air pockets from forming after contact has been made, the print taken from the wash water must be given a short final wash in an air-free liquid (or "de-aerating bath") before it is placed down on the glazing surface.

To prevent the trapping of air bubbles the application of the prints to the glazing surface must be done exactly according to the following procedure:—

The print is removed from the de-aerating bath *and is at once transferred to the support, without draining.* One edge only is now allowed to make contact with the support; the fingers of the left hand hold this end in place, while the fingers of the right hand keep the remainder of the print up, and away from the support, so that the liquid, remaining upon the print from the de-aerating bath, now travels down

its surface, and collects in a small pool at the fixed end. Now, still holding down the end already fixed, the print is gradually "rolled" on, by giving a curvature to the free portion during the whole operation. This curvature is of the greatest importance, and is obtained merely by keeping the top edge of the print always well back from the advancing point of contact, as shown in the diagram. The print thus acquires a certain amount of "spring," which will force contact with the support; without this "spring," the various parts of the print would simply "flop down" of their own weight, and a rather doubtful contact would result. Consequently, when working properly, the print is actually being rolled into contact.



Once having started to apply the print *it is essential not to stop until it is completely on, since the constantly advancing wave of air-free fluid is the important factor in preventing air-bubbles.*

A further factor, which is vital in obtaining easy stripping of the glazed prints, is the suitable lubrication of the glazing surface. For this purpose plain oxgall (preferably of the refined variety) is recommended, used at a concentration of 1 oz. in 140 ozs. of water. In order to make this stripping solution act also as the de-aerating bath *it is essential that it should be made up with distilled water (or boiled-out water) and not, as usual, with ordinary tap-water.* Moreover, as this stripping solution tends to become aerated from the wash water that passes into it, it should be well boiled after every two or three batches of prints have been put through it, so as to de-aerate it anew.

Prints so glazed come away with a light touch on a corner and with a very brilliant glaze.

To avoid creating air bubbles in the stripping bath it is important to slip each print in edgewise, so that it cuts its way into the solution. One or two seconds at most are needed in this bath.

When the glazing sheet has been filled up on one side with prints applied in the manner described, lay a double thickness of chemically pure blotting paper over them and run a roller squeegee *lightly* over until the surplus water is taken up.—B.J., 1931, Aug. 28, pp. 512-514.

FACING WITH CELLOPHANE.

Cellophane-Facing of Prints.—Several methods of applying Cellophane sheets as a protective coating to photographic prints have been described by J. L. Sheldon.

Sheets of Cellophane wrapping material are soaked in water for five or ten minutes—until thoroughly stretched. A sheet is then squeegeed on a ferrotype plate by means of a wringer, and the glossy print squeegeed down on to it. The following are alternative methods :—

1. The dry print is moistened by quickly dipping in water and is then immediately squeegeed to the Cellophane. A blotter is put over the print and the whole thing is put under a mounting press for three minutes at normal mounting heat. The blotter is then quickly slipped out and the press brought down directly on the print for about a minute. It is then quite dry and comes off the tin easily.

2. The print is taken directly from the wash-water, squeegeed over the Cellophane, and then put under pressure (a copying press does very well) with a couple of blotters over it. In a few hours a good share of the moisture has left the print, and it can then be put under the hot press with a dry blotter over it—the same as in No. 1.

3. The prints are taken directly from the wash-water and placed for ten minutes in hot water at about 120° F. They are then squeegeed over the Cellophane—stacked up under pressure with a couple of blotters over each print, and left for several hours, say overnight. They are then still a little damp and are taken from the tins and put between dry blotters under light pressure until dry.

4. In the above methods the prints were fixed in an acid hardening bath. In this method they are fixed in a plain hypo bath and are then treated the same as in No. 3, with the exception of not being put in the hot water.

5. Where a glossy drying machine of the drum type is available, this method can be used. The prints direct from the wash are squeegeed to the Cellophane on tins, as before, then immediately stripped off and run through the dryer. Or, the Cellophane and print can be floated together in water and then run through without squeegeeing together—care being taken to see that the Cellophane is not wrinkled.

6. This is a variation of No. 2, and does well where the prints are to be dry-mounted. Instead of putting under a hot mounting press, after having stood under pressure for several hours, the prints are stripped off and run through

a regular heated belt dryer. There is a slight tendency to produce shallow wrinkles, due to insufficient pressure. Dry-mounting removes these.

The process depends on either drying the print by heat under pressure, or by drying under pressure cold with the emulsion in a softened state. The union is so good that the Cellophane becomes practically integral with the emulsion. —Commercial Photographer, 1931, Aug., pp. 639-642.— B.J., 1931, Aug. 14, pp. 483.

TONING DEVELOPMENT PRINTS.

Pure Whites in Sulphide Toning.—The causes of tinted whites in sulphide-toned prints have been analysed by R. R. Rawkins.

In developing prints every precaution must be taken to avoid forcing, also against aerial fog due to exposing the developing print to air; and the developer must have a sufficient, fairly liberal content of bromide. It is the best practice to give prints for toning slight over-exposure and develop them in a well-restrained developer. An amidol developer containing ½-grain of potassium bromide to the ounce is recommended, or the Ilford M.Q. developer with the bromide increased to 1 grain to the ounce.

But the chief precaution concerns fixing, since imperfect fixation from whatever cause will lead to degraded whites. The use of two separate fixing baths (the latter freshly made and used for a limited number of prints only) is the only certain preventive. The second bath should be made up in sufficient bulk to deal with a full batch of prints, calculated on the basis of 120 square inches of print per 20 ozs. of fixing solution. It should be a plain hypo solution, and must not be used below 60° F.

When it is necessary to clear the high lights of prints it should be done before toning, with ferricyanide-hypo or preferably the cyanide-iodine reducer.

If the former is used the best way is as follows: A 20 per cent. solution of plain hypo, freshly made, is poured into a clean white dish, and diluted with four times its original volume of water: enough potass. ferricyanide solution is then added to give a pale lemon yellow. This bath is used immediately, and when prints require only slight clearing it is only necessary to draw each print through the solution and place in running water.

The working rules for avoiding impure whites in toning may be summarised as follows :—

1. Make test exposures to find the correct exposure for a black print, and add 20 per cent. to this exposure for prints which are to be toned.

2. Make up the developer so that the proportion of potassium bromide is twice as much as when making ordinary black prints. Do not use an M.Q. developer in which the carbonate far exceeds the sulphite unless this is compensated by a high proportion of potass bromide.

3. Use the correct grade of paper to suit the negative, and do not attempt to obtain increased contrast by forcing in development.

4. Make sure that the lighting of the printing-room is safe, and avoid exposure to the air whilst developing.

5. Fix the prints in the usual acid fixing bath for 10 minutes at not less than 60° F., keeping the prints on the move. Then transfer the prints, one by one, to a freshly-made 4 in 20 hypo bath for a further 10 minutes. Do not turn up the white light until the prints have been through both baths.

6. Use pure sodium sulphide made up with boiling water in as strong a solution as possible, and stored in glass-stoppered bottles. When decanting, do not disturb any precipitate, and do not use the last ounce or so of the solution if it has turned green.—B.J., 1931, April 10, pp. 207-208.

Sepia by Partial Bleaching.—For toning bromides to a true sepia colour, matching the Autotype cool sepia water-colour cake, A. B. Cooper advocates the method of partial bleaching followed by sulphiding, and claims that there is no risk of double toning if the bleaching solution is made up as follows, from two stock solutions :—

A.	Potass. ferricyanide	5%
B.	Potass. iodide	10%

For use, take 1 part of each A and B to 18 parts of water, i.e., A. ¼ oz., B ¼ oz., water up to 5 ozs.

The prints should be exposed and developed to give a good deposit of silver to get the best tones, and appear to tone better if dried and re-soaked just before toning.

For a rich warm black tone bleach the print for half a minute (it is best to use a watch and not guess), and then, after a short wash, sulphide in the usual way. For sepia tones, bleach for one minute or more according to tone desired.—B.J., 1930, Oct. 17, p. 635.

An alternative bleaching bath which appears to overcome the risk of double tones through partial bleaching is that recommended by R. Llewllyn :—

Potass. bichromate sat. sol.	...	...	2 parts
Common salt 20 per cent. sol.	...	...	1 part

Used for from 2 to 10 minutes.—B.J., 1930, Nov. 28, p. 727.

Permanent Red-Brown Tones.—For the production of permanent bromide prints of reddish-brown colour Dr. Mennenga recommends a method in which prints are first treated with a mixture of hypo and the commercial selenium toner sold as Senol, before being sulphide-toned in a slightly different way. Prints are thoroughly fixed in an acid fixing bath, well washed, and then immersed for from three to five minutes in a mixture containing 3 ozs. hypo and 1 fluid ounce of Senol in 20 ozs. of water. Very little effect on the print is visible in this bath. The print is then washed in running water for 15 minutes and bleached in a solution containing 90 grs. each of potass. bichromate, potass. ferricyanide and potass. bromide in 20 ozs. of water. Bleaching takes place very quickly, a reddish residual image appearing almost at once. Prints are washed to remove yellow stain completely, and are then darkened in a 1 per cent. solution of sodium sulphide. The final colour undergoes very little change as the prints dry, whilst the results are found to be of excellent permanence. The Senol-hypo mixture and also the bleaching bath may be used repeatedly, but the sulphide solution must be made up fresh for each batch of prints.—Phot. Rund., 1931, September, pp. 350-351.—B.J., 1931, September 25, p. 569.

Toning Chloro-bromides.—A review of methods of toning chloro-bromide prints has been published by R. R. Rawkins, following a study of a great many possible methods.

Whereas the usual sulphide toning tends to give yellowish colours, the hypo-alum process produces beautiful tones. Bleaching and re-development in Schlippe's salt gives extremely warm tones, but with degraded whites. The one-solution Senol developer gives rich chocolate tones, and on a very dark, over-exposed print very warm tones can be obtained by bleaching in the usual ferricyanide-bromide bleacher and re-developing in Senol.

But the most satisfactory method, one which gives a range of tones from warm-black to yellowish-red sepia, is that of partial bleaching in acid permanganate followed by immediate sulphiding, without washing or rinsing.

A chloro-bromide print is made either in black or in warm tone, by any of the usual methods. A working bleacher is made up from the following stock solutions :—

No. 1 Hydrochloric acid (pure)	12 ozs.	150 c.c.s.
Water to	80 ozs.	1,000 c.c.s.
No. 2 Potass. permanganate	180 grs.	4·5 gms.
Water	80 ozs.	1,000 c.c.s.

To make a working bath take, say : water 20 ozs. (250 c.c.s.) adding 2 ozs. (25 c.c.s.) of No. 1 and 2 ozs. (25 c.c.s.) of No. 2. This working bath must be used immediately and thrown away when a dozen prints or so have passed through and made the solution somewhat muddy.

The print is immersed for a definite number of seconds (from 5 to 60), taken out and immediately transferred to a 5 per cent. solution of sodium sulphide for one minute. It is then washed for 15 minutes and dried. Ten seconds' bleaching is recommended as giving a beautiful brown. The toned prints are permanent.—B.J., 1930, Oct. 24, pp. 640-641.

Non-Staining M.Q. with Alkali.—The surprising observation has been made by Dr. Lüppo-Cramer that a metol-hydroquinone developer made up in the usual way, *but with the alkali omitted*, acquires excellent properties as a developer for gaslight paper, when the solution has been left standing exposed to air for about a fortnight.

A suitable formula is as follows :—

Metol	5 gms.	44 grs.
Hydroquinone	7·5 gms.	66 grs.
Potassium bromide ...	1 gm.	9 grs.
Soda sulphite, anhyd. ...	50 gms.	1 oz.
Water to make	1,000 c.c.s.	20 ozs.

The solution so made has at first no useful developing properties. It is, however, to be placed aside in an open bottle, which it about half fills. After the lapse of a week or two it will be found to have become an active developer of gaslight papers, transparency plates and other fine-grain emulsions, practically as quick and vigorous in its action as a normal alkaline M.-Q. developer. The developer in its aged condition shows only a slight yellowish colouration. It has the actual advantage that it does not stain the fingers.—Phot. Indus., 1931, May 27, p. 548; July 8, p. 708.

OLEOBROM.

Practical Points in Oleobrom.—In Oleobrom printing the first essential is a developed image of the proper quality on the special Oleobrom bromide paper. The image must be in soft greys, and if a negative tends to give rich blacks they must be prevented by such methods as dilution of the developer, slight over-exposure and curtailed development.

It is advisable to deal with negatives of various kinds in the following way, using in each case the usual M.Q. developer diluted with four times its bulk with water for Nos. 1 and 2 methods, and ten times dilution for No. 3 method.

1. *The Thin Poor Negative.*—Expose so as to produce a print of full depth in the full development time, obtained by trials on pieces of the test paper which are enclosed in each packet.

2. *The "Good" Average Negative.*—Expose as above, but do not push development quite to its limits.

3. *The Harsh Negative.*—Expose for about one-third longer than usual and stop development short of full, using a diluted developer. In this method, the image must not be unduly flattened, as a poor quality will give flat, lifeless prints when linked up.

If a suitable bromide print is obtained, by the use of such methods, "straight" pigmenting will then give excellent results in minimum time, and without an undesirable amount of rolling.

The preliminary inking of the surface of the dry print has a distinct bearing upon the contrast—a heavy application giving increased contrast, and a light coating producing softness. Taking as examples the prints produced by the methods suggested above, a print by No. 1 method would want a heavy application in order to get increased contrast. No. 2, a medium tint, and No. 3 a faint tint to keep down the contrast.—B.J., 1931, Feb. 13, pp. 87-88.

Inking Manipulations.—The following notes on the inking of Oleobrom prints relate to difficulties which may at first be met with in this process.

The first source of trouble may be in rolling an even (or sufficiently even) coating of pigment on the dry print. It is chiefly necessary to cover the whole image surface. First, the rubber roller is well rolled out on the palette to even its layer of pigment thoroughly. Then draw the charged

roller over the print in one direction and, without lifting the roller, roll in the opposite direction.

In loading the palette a little of the ink is squeezed out in a thin line along the near edge of the palette and spread evenly by a large-diameter roller used in the following way: Roll firmly towards the distant edge of the palette, and when it reaches almost to the end, lift the roller sharply so that it spins for an instant. By repeating this action backwards and forwards a few times only, a perfectly even spread is obtained in a minimum of time. The roller which is used for this work becomes too heavily coated to be suitable for use in spreading the ink direct on the dry print, and, therefore, it should be rolled a few times on the second palette to remove some of the ink and provide a lightly-coated palette for use when carrying out the final inking-up.

In inking the print take care to start the roller on the clear margin at the edge, as a heavy bar of ink is liable to be left if the roller is started on the picture space. The first inking should not be very heavy.

The next stage is immersion in the water-bath. Porcelain or enamelled dishes are not suitable for this purpose, owing to their want of flatness. The best is a stout wooden dish fitted with a thick plate-glass bottom. Otherwise place in the dish a large piece of stout glass and place on top of this the rubber mat supplied. Sufficient water should be placed in the dish so that the rubber mat is submerged a quarter of an inch. Rolling under the water then follows, and should be continued until all greasiness has gone. Lift the print out of the water and hold it horizontally; the water should cling to the high-lights and not run into drops.

The wet print is drained, placed face up on the cork mat and swabbed with wet, soft muslin. Care must be taken not to rub the wet muslin over the shadows, otherwise the ink on those parts will split up into blobs.

After this cleaning up the surface is gently mopped with a soft, dry swab, leaving the print surface moist but without any trace of water.

Inking-up must be done at once whilst the print is moist. The small-diameter roller, 7-9 ins. long, is suitable for the purpose. If the print already possesses considerable contrasts with depth in the shadows, the inking should be done with a very light charge, relying on repeated applications to get the detail without unduly blocking up the shadows. If the print already has too much depth in the shadows,

take a perfectly clean, dry roller and pass it over the print several times to remove the excessive ink, and then proceed with the usual inking-up. It is possible either to build up the image gradually with repeated light applications, or to start with a heavy application and roll off the excess afterwards. Where local control is practised the latter method is preferable.

Too heavy pressure on the roller will inevitably result in loss of definition, and risk of coarse grain and blisters. Light pressure tends to *deposit* ink, whilst heavy pressure takes it off and develops grain. Very light pressure may result in an uneven deposit of ink. Restraint must be exercised in order to avoid over-rolling. Prints will sometimes ink up in quite a few direct rollings. Continued rolling sometimes results in a spoilt print. If the print refuses to give sufficient contrast it should be replaced in the water bath and re-rolled with the wet roller.

This same procedure is adopted when it is desired to re-ink a print which has been spoilt by too heavy pressure or damaged by water getting on the surface during inking, but in this case the " clean-up " preparatory to re-inking must be very cautiously carried out in order to avoid blobbing. The print is removed from the water, drained, placed face up on the cork mat, and the surface gently dabbed with an almost dry lintless cloth. Any superfluous ink on the margins can be removed by rolling with a clean, dry roller.

Dry the prints by pinning them to the edge of a shelf in a room free from dust. After 24 hours the prints will be reasonably dry, and at this stage a certain amount of further control is possible by rubbing away, with india-rubber, parts where it is desired to introduce high-lights.

When work has been finished, the rollers, palettes, dishes, etc., should be thoroughly cleaned with petrol in readiness for the next day's work.—B.J., 1931, June 26, pp. 376-377.

Bromoil in India.—Writing from Delhi, Major E. W. Dann has recorded some interesting points in his experiences with the Bromoil process.

He recommends a copper chloride bleacher as the most suitable, but on using the formula given by Hey Sharp in 1931 B.J. ALMANAC (p. 192) found it quite ineffective, doubtless as a result of chlorination of the water. With twice the amount of copper chloride the solution worked well. When

distilled water is used it is possible to adhere to the original formula, viz. :—

Copper chloride	320 grs.	36·5 gms.
Common salt	640 grs.	73 gms.
Potass. bichromate	32 grs.	3·6 gms.
Water to make	20 ozs.	1,000 c.c.s.

For use dilute with an equal volume of water.

Working with a daylight enlarger, he has found Bromoil paper best for plain bromide work, and bromide paper (especially Cream Crayon and normal White Chamois) best for Bromoil. When possible, the best conditions for soaking are obtained by a first long soaking in really cold water, then a brief immersion at 75° F., with a final return to cold water until the paper is needed.

As developer, borax M.Q. has much to recommend it. It is slow-acting, easily controllable, gives a long scale of tones without too dense a black and does not attack the gelatine coating.

Major Dann gives it as his opinion that it is the original negative which is the key to success. If this is made on a soft plate or film and developed gently, the rest is easy. —B.J., 1931, April 17, pp. 223-224.

CARBON PRINTING.

Exposure with Half-watt Lamps.—Ferdinand Flodin, the eminent Swedish portrait photographer, has published a description of the method of exposure determination which he has made the basis of his system of making carbon enlargements.

For printing carbon tissues he has adopted the use of half-watt bulbs, which are ideal for the purpose of systematising carbon printing with absolute ease and certainty. The installation recommended is a group of four 500-watt lamps set in a framework with about 12 in. between them. Printing is then carried out at a fixed distance, which may conveniently be 16 ins.

The only difficulty then lies in the testing for the time of printing. This is overcome in this system by means of a printing meter consisting of five differently exposed negatives side by side on a strip of film, made with successive exposures from one transparency. A test strip that has proved convenient in practice was made by giving exposures of 2, 4, 6, 8 and 10 seconds respectively: the series of negatives (of increasing density) thus formed, proved to have exposure

times of 8, 16, 24, 32 and 40 minutes for printing on carbon tissue. These negatives covered the usual range of negative densities, without having any unusually dense or unusually thin. Each of these five test negatives should be not less than 3¼ in. on the longest side.

This test strip of negatives may be used most simply by comparing the negative to be printed with the test negatives: the one that corresponds most closely with the given negative as regards density will indicate the approximately correct time for printing.

This is usually quite sufficient, but a safer way is to make a small trial print from the negative to be printed in carbon on a bromide paper and develop this to the proper depth. Note the correct number of seconds of the exposure. After this, take a piece of the same bromide paper and place it over two or three of the small proof-negatives and print this for exactly the same length of time. As the time for printing each trial negative in carbon is known, one only has to choose the small bromide print which in depth and gradation is most similar to the trial bromide print from the large negative, to know exactly how long the carbon need be printed.

In printing carbon enlargements in this way Eastman Commercial Ortho film is recommended as suitable for making the required soft transparency. When the original negative is fairly large it is convenient to make the transparency by contact, with the printing light, *e.g.*, a 25-50 c.p. ceiling light, from 5-6 ft. away and with the printing frame covered with a ground glass. Exposures will then average about ten seconds. If the final print is to be much enlarged it is best to make the transparency by enlargement to an intermediate size.

For the making of the enlarged negative from this transparency use of X-ray films is very strongly recommended, on account of the rather low speed and very rich emulsion. Agfa X-ray film is rather more contrasty than the Eastman and Gevaert varieties.

In sensitising the carbon tissue the bichromate sensitising solution should be varied in strength according to the contrast of the negative to be printed; a weak negative requires a diluted bath, a strong negative a stronger bath, varying from about 2 per cent. to 4 per cent. A normal bath is the following:—

Water...	... 1,000 c.c.s.	20 ozs.
Bichromate of potash	... 30 gms.	260 grs.
Ammonium carbonate	... 5 gms.	44 grs.

The temperature of the bath should not exceed 62 to 65° F.

The usual sensitising time is 2 minutes, but it may be increased to 3 minutes if it is necessary to obtain a soft print from a strong negative.

Quick drying after sensitising is very important, so that a drying cupboard with a forced draught is really necessary.

The printing time alters if the sensitising solution is varied in strength. Paper sensitised in a weak bath requires a good deal longer printing time, and conversely. Further, the colour of the tissue influences the time of exposure appreciably; for instance, Turner sepia and warm sepia print more slowly than grey-green, terra cotta or red-chalk, whereas the blue colours print quickly.—B.J., 1931, March 27, pp. 179-182.

A DIFFERENT CARBRO PROCESS.

Prints on Extra-thin Papers.—H. D. Murray and D. A. Spencer have devised several variations of the Carbro process, one of which is suitable for producing pigment images *within* the substance of very thin paper, thus affording distinctive effects.

A bleach is made up, viz.:—

Uranium nitrate	1 gm.	90 grs.
Potass. ferricyanide ...	2 gms.	175 grs.
Potass. bromide	2 gms.	175 grs.
Potassium bichromate ½% solution	12·5 c.c.s.	2½ ozs.
Soda sulphate, cryst. ...	20 gms.	4 ozs.
Water, to make	100 c.c.s.	20 ozs.

There is also prepared a solution of gelatine, viz.:—

Nelson's hard gelatine ...	30 gms.	525 grs.
Glycerine	10 c.c.s.	3¼ drams.
Water...	500 c.c.s.	20 ozs.

This is kept at 130° to 150° F.

The bromide print is made with a white margin and must be of a broad contrasty subject. A piece of thin unsized paper about 1 in. larger each way than the bromide print is cut. A suitable paper is Japanese No. 53, sold by T. N. Lawrence, Red Lion Court, Fleet Street, London, E.C.

The bromide print and the thin paper are soaked in cold water, the latter with its smooth side in contact with the bromide print. The bromide print is then laid face up on a sheet of glass and squeegeed down. The thin paper is floated for about a minute on the hot gelatine solution,

removed by the corners and laid on the bromide print. A stout sheet of wet paper is laid on, and excess of gelatine removed with the squeegee. The paper is stripped off and the squeegee applied very gently to the Japanese paper. The latter and the bromide print are now secured to the glass passe-partout fashion, with gummed tape.

Without drying, the whole glass sheet is placed in the bleaching bath, and the back of the Japanese paper is firmly but lightly brushed with a camel's hair brush to remove air-bells. Bleaching is complete in about two minutes. The progress of the bleaching can be readily observed through the paper. The surface of the sandwich is then rinsed thoroughly under the tap. A sharp knife is inserted under the bromide print, and the Japanese paper cut all round. The latter is carefully stripped from the bromide and washed in gently running water for half an hour. If difficulty occurs in stripping, place in warm water. The print may be dried after taping down on glass, but greater depth is obtained by soaking in the gelatine solution and squeegeeing to a slightly tinted wet backing paper, taping down and drying. A final coat of the gelatine solution given to the print before drying imparts an underlying sheen to the paper. Brush marks similar to those seen in wood-block prints are obtained by brushing the print with a brush sparely charged with a gelatine solution before passing it into the bleaching bath.—B.J., 1931, June 5, p. 331.

DYE TRANSPARENCIES.

Eosine-silver Carbon Transparencies.—Transparencies of great beauty in colours from purple-red to chestnut brown, combining the softness of a carbon transparency with the fine detail of a silver transparency, may be made by a process of daylight printing described by G. O't. Hooft.

A Kodak Commercial cut film is stripped of its gelatine backing and soaked in a 1 per cent. solution of eosine. The film is drained and blotted with absorbent paper, wiped dry on the stripped back, and laid down with this latter in contact with the negative for printing.

On the intensely red-stained gelatine surface is laid a protecting celluloid sheet of equal size, in order to prevent drying of the emulsion during the long exposure. In subdued sunlight the exposure is about an hour. Since the heat of the summer sun would spoil the picture a large sheet of translucent paper must be fixed in front of the window, and the printing frame set up some distance away from it. In

the height of summer a double layer of this paper may be needed.

After exposure, the film is taken out of the printing frame, and its protective sheet carefully pulled off. The film is then immersed in water at 95° F., and development carried out in the carbon manner, with the assistance of a brush or rubbing with the finger. The developed image is very dark and is fixed in a hypo bath. Lest the red colour should be washed out, the picture must be washed for a short time only in water. Finally the picture is dried.

In this process the eosine first acts as sensitiser to the gelatine coating and then as dye by which the image in insolubilised gelatine is stained. This coloured image is combined with a heavy silver image, producing a transparency of rich colour and great beauty.—Phot. Korresp., 1931, March, pp. 72-78.—B.J., 1931, April 10, pp. 209-211.

ENLARGING.

Hair-line Focussing Screens.—The use of ruled screens, or similar screens improvised by scratching a blackened plate, as an aid to focussing in enlarging is well known. But this can be improved upon for critical focussing by using a few actual hairs, which may be either laid down on the wet gelatine film to adhere on drying, or sandwiched between two plain glasses.—B.J., 1931, May 1, pp. 253-254.

Enlarging from Film Negatives.—The exposure of film negatives to the heat of an enlarger often leaves the film with a curious distortion, with undulations running in concentric rings. This effect, and the factors for its avoidance, have been studied by Stefan Jasienski.

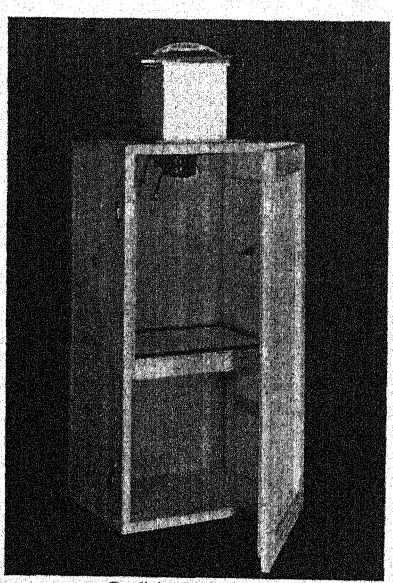
The factors prescribed are: (*a*) that the films be as dry as possible; (*b*) the heating in the lantern be reduced to the minimum; and (*c*) either no air should be allowed round the film or an even layer of air all over.

To give increased protection from heat a sheet of plate glass ($\frac{1}{8}$-$\frac{1}{3}$-in. thick) may be placed between the light and the film.

It is not necessary to clip the film between two sheets of glass. A film is better left to lie free in a space about $\frac{1}{32}$-in. thick. This is best done by enclosing the film with a card mask which is of double thickness along the longer edges and single along the shorter. This leaves an air gap between the under glass and the cover glass, and allows air to circulate sideways over

the film. It is excellent to use the sheet of plate glass as the cover glass, thus combining the two expedients.—Phot. Indus., 1931, September 30, p. 1066.

Enlarging without a Dark Room.—The illustration shows a box enlarger which D. Charles has designed for a system of enlarging on gaslight paper without a dark room, either by daylight or with a half-watt lamp. It employs a lens of large aperture. As it stands, it enlarges from $2\frac{1}{4} \times 3\frac{1}{4}$ in. to whole-plate or quarter-plate sizes, and to any degree between them. It consists mainly of a box with a door. The box is about 20 in. high by about 10 × 7 in. laterally; the door is formed of a frame of batten strips, with a piece of plywood screwed on to the inside face of the frame, thus forming a rebate, which prevents light entering when closed. The door is hinged, and a pair of simple hooks and eyes keep it shut when closed. A hole is cut in the top end of the box, and a smaller box fitted over this. This latter box is a little larger than the negatives, and its depth is the same as the focal length of the lens used, which may be the same lens with which the negatives were taken. In this instrument the lens has been fitted with a focussing mount of unusually large diameter, fitting a flange: with a smaller diameter part of the negative image would be cut off when using the fullest extension, namely, when enlarging only slightly. The lens is a $3\frac{1}{2}$ in. anastigmat. The diameter of the threaded tube is $1\frac{3}{4}$ in., and its length is $\frac{3}{4}$ in. Actually the diameter could be less and the length more, with advantage.



Daylight Box Enlarger.

In many cases it would be more convenient to raise the negative only slightly above the main box, and to provide the range of extension by means of the camera used originally for making the negatives.

Inside the main box is a sliding platform to act as the enlarging easel. This platform is provided with upright walls at the sides only, and there are slots in these ply walls to guide the platform squarely up and down over two bolts put through the box from the outside. A washer and fly-nut on each of these bolts serve to secure the easel at any desired level.

Around the upper part of the small outer box are fixed some little strips, by means of which a couple of pieces of clear glass can be clipped, between which to sandwich the negative. The condenser lens seen above the small box is not an essential part and for the moment should be ignored.

When the apparatus is to be used for enlarging by artificial light, an electric bulb of the Argenta type is hung above the apparatus, and a 4 in. condenser is laid on top of the negative stage, with the negative in position. The position of the light is adjusted until the illumination is even, with the negative correctly focussed. Using a 40-watt Argenta bulb in this way, with an $f/4 \cdot 5$ lens and slow gaslight paper, whole-plate enlargements from good negatives require from ten to twenty minutes' exposure. If the condenser is not used, a piece of flashed opal must be used instead, with correspondingly longer exposures. The latter arrangement is specially convenient for exposures made by daylight, by loading the enlarger in a shaded room and taking it to the window or out of doors to make the exposure.

The half-condenser seen on top of the negative carrier is used to shorten the exposures in daylight work. It collects light from a wide expanse of sky and converges the whole through the enlarging lens. It gives a great increase in the brilliance of the image.—B.J., 1931, April 3, pp. 195-197.

Combination Printing by Enlargement.—An improvement on methods of combination enlarging as generally known has been described by D. C. Rowlett as being his practice, which he has proved to be very successful.

The method depends on the employment of a board appreciably larger than the bromide paper, in combination with hinged non-actinic paper flaps, attached at one end to the extremities of the board.

Assuming that a foreground requires protection for insertion of another, a sheet of fairly stiff orange paper is placed over

and stuck to the lower end of the board, affording a flap which can be folded back and restored exactly to its original position. The image is projected on to the paper, the contours are outlined in pencil and cut out. With the flap covering the lower part of the bromide paper, exposure is made for the upper part. The flap is then folded back for insertion of the foreground, the exposed part of the bromide paper being covered in similar manner. Flaps may be attached to all four sides of the board and brought into operation, one after the other, if this should be necessary to meet the pictorial requirements.

Figures and groups are inserted by the well-known expedient of cutting them out of separate prints, mounting them on the main print and copying the combined picture. If the whole work is done while prints are wet, the cut-outs adhere firmly without adhesive and the maximum quality is retained.

If the print is copied by daylight out of doors, the edge of the cut-out is liable to be apparent. This can be entirely avoided by placing the print in a doorway and photographing it from outside. With a little adjustment, backwards and forwards, a position will be found when the edge of the cut-out will be indetectable.—B.J., 1931, Jan. 16, p. 39.

Photo-murals for Wall Decoration.—A new type of wall decoration, which has obtained a certain vogue in the U.S.A., following its introduction by the Eastman Kodak Co., consists in the use of large photographic prints in place of the usual wall paper. In the case of subjects which are enlarged to very large dimensions the print may be hung in strips, as is usual in wall papering, the joins being carefully prepared and pieced together. In addition to ordinary photographic pictures there are many types of originals, e.g., etchings, engravings, drawings, paintings, fabrics, draperies, etc., that can be worked into such a scheme of photographic wall decoration.

A single-weight bromide paper, such as the Eastman P.M.C. No. 3, is suitable, especially for colouring with oil or water colours. For pastel colouring the P.M.C. No. 5 variety is recommended as preferable. The making of the prints does not differ from customary enlarging, except that the images should be kept in light tone. It is advisable to make a test of the thoroughness of washing by means of the permanganate test for hypo.

When a picture is so large that it has to be covered with several strips, the bromide paper must be exposed in sections with about an inch overlap, to allow for the accurate matching of the edges when the strips are hung. These edges should

be rubbed down, on the back, with a sand-paper block, so as to aid in obtaining a neat join and good adhesion.

In hanging the photo-murals the wall must first be sized with any good conditioning preparation. The print, well wetted in a tank or thoroughly sponged on the back, is rolled emulsion-side outwards for about ten minutes and then unrolled immediately before hanging. The prints are hung wet, after well coating with good paste. In hanging, it is necessary to plumb the edge with a line and bob. The hung print is rubbed over with a wet sponge. The adjoining strip, which has to be matched up exactly, needs to have the one edge trimmed and champfered before hanging is attempted.



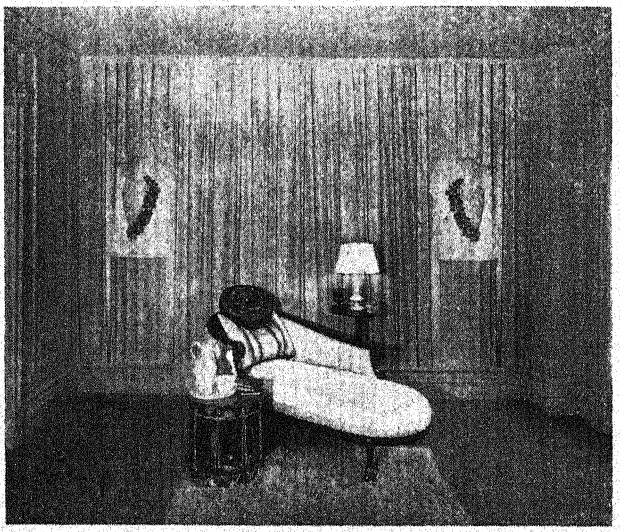
In hanging, prints are rubbed down with a large, wet sponge.

Since the charm of photo-murals lies in their decorative effect it is best to diffuse the print in enlarging by projecting through bolting silk and by colouring for effect without strict realism.

In colouring with oil colours thin the colours with boiled linseed oil till they can be brushed out. Spread the colour over a selected area with the brush quite roughly. Removal of the excess of colour should be done with absorbent cotton, rubbing it down until it is smooth. Details should be treated in a broad and sketchy manner. Colours can be removed with boiled linseed oil : or if dry, with carbon tetrachloride. Colours satisfactory for

photo-murals are: burnt sienna, lemon chrome yellow, deep chrome yellow, ultra marine blue, Madder Lake, Toluidine red, Milori blue.

The best method of colouring photo-murals is with pastel colours. Pastels are often coated with Kodalak W. P., a water-proofing lacquer that protects the mural and makes it possible to wash the mural with water and soap. Kodalak is applied by spraying with an air brush, without bringing the



A room papered with enlargements made from negatives of silk draperies.

brush so close that the force of air blows away any of the pastel colouring. The application of Kodalak reduces colour brightness about thirty per cent; therefore, an allowance of about 30 per cent. accentuation in colour brightness should be made if this lacquer is to be applied.

Satisfactory results in colouring can also be obtained with water colours. This medium is most successfully applied with an air brush.—B.J., 1930, Dec. 19, pp. 761-764.

CONTROL SCREENS FOR THE ENLARGER.

Shading in Enlarging.—J. H. Cleet has described a fitment for the enlarging lantern consisting of two flaps at top and bottom. The flaps are not only pivoted so as to allow of their being placed at various angles, but are also made adjustable in length, with the object of securing hard or soft lines at will. Also the outer flaps swing from the straight, so that they can be set to suit the subject.

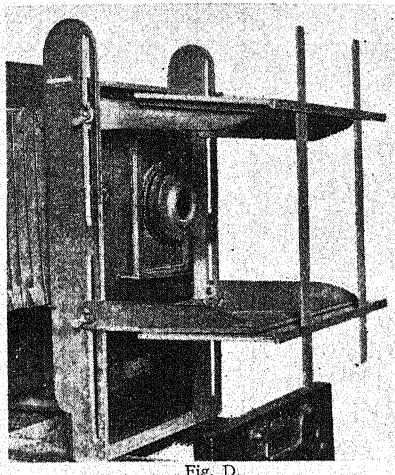


Fig. D.

Very often an irregular soft line suffices for, say, cloud printing, but, if any regular line is necessary, a mask is cut and pinned to the upper flap. This is lowered and manœuvred into position until the desired result is seen on the easel. The corresponding part of the cut mask is pinned to the edge of the lower flap, which is now raised to get suitable correspondence between the two mask edges. The bottom flap is again lowered, and we proceed to print the subject. On now raising the bottom flap into the position previously found, then raising the upper flap clear, the cloud negative is then inserted and the sky portion of the print exposed. This procedure will apply to all combination printing, and it will be observed that whilst the sky, foreground, or other parts of the picture are being shaded right out, the hands are free for local shading.

Once the relative exposures have been ascertained, a run of uniform prints from one negative, or a set of negatives, is guaranteed.

For vignetting of any kind, a mask is simply pinned to the two flaps, as shown in fig. C.

With some subjects there is the need for soft-edged rectangular masking. To do this, the outer edge of the flaps has

Fig. C.

Fig. B.

Fig. A.

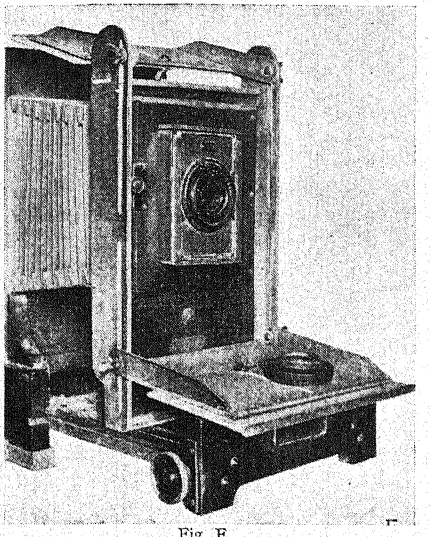


Fig. E.

a slot in which two thin lengths of wood are gripped, as shown in fig. D. These strips, with the flaps, can be moved about as desired to get the result required with a given subject. When not in use, the upper flap can be pushed back clear of everything, and the lower one used as a shelf or receptacle for lens caps, etc., when focussing or adjusting, as shown in fig. E.

The entire outfit is made out of plywood, the various parts being held together by fly nuts.—B.J., 1931, July 3, p. 392.

Automatic Enlarging.—Electrical mechanism has been invented for the automatic determination of the time of exposure in making prints or enlargements. It is based on, first, ascertaining the quantity (intensity × time) of light required for the exposure of a given bromide paper and then supplying this quantity through the agency of a photo-electric cell, which can be used to cut off the light of the enlarger or printing box when the required exposure has been given. The installation for the making of prints or enlargements on this principle is of considerable complication as regards both the mechanical and electrical details. In one form of the outfit the principle of automatism is carried to the point that the apparatus of itself cuts off the exposed length of paper in readiness for development. The electrical and other details of this system are the subject of Eng. Pat. No. 344,900 of the Cambridge Instrument Co., and E. B. Moss, and No. 349,983 of Adam Hilger, Ltd., F. Twyman, C. F. Smith, and D. H. Follet. (B.J., 1931, July 31, pp. 455-457.) Reference is made to this new principle in the exposure of development papers in the article "To-day's Photography," earlier in this volume.

TRIMMING AND MOUNTING.

Simple Deckle-edge Trimming.—The too regular appearance of a machine-made deckle-edge may be avoided, in the trimming of photographic prints, by tearing the edges of the print off by hand. A very useful device by which this operation may be carried out has been described by R. R. Rawkins.

The device is made from two pieces of cardboard hinged together at one side, forming a sort of " book " cover which, when closed, acts as a grip for the print or mount, and also as a straight-edge against which the deckle is obtained by tearing the protruding print between the forefinger and thumb.

To make the " book " take two pieces of six or eight-sheet cardboard, say, 20 in. × 16 in. each, and place them side by side flat on the bench, so that one of the 20-in. sides is flush with a 20-in. side of the other card. Now hinge these together with a strip of bookbinders' cloth, or something similar, 20 in. × 2 in. wide, taking care to keep the edges of the card flush together. When the hinge is firmly attached, close the book, and at once proceed to fix another hinge to the outside, so as to strengthen the inside hinge. It is essential to make a good job of the hingeing, as any sagging of one card over the other will lead to inaccuracies.

Prints or enlargements should be a trifle larger all round than the trimmed print is desired to be. This margin can be about $\frac{3}{4}$-in. wide, or sufficient to provide a grip. The print is slipped face up into the book and adjusted so that a trifle more than the part to be torn off protrudes. The book is then placed on the bench so that the edge overlaps it slightly, and the left hand placed firmly upon the book. The tearing of the edge is done by placing the forefinger under the edge of the book and tearing the edge *downwards* with a drawing action of the thumb, all the time pushing the thumb flush against the edge of the book. Now open the book and replace the print in position for tearing the next side, but this time with the first torn edge flush to the 16-in. way of the book, so that it acts as a right-angle. Proceed in this way until all sides are torn. Mounts may similarly be given a deckle-edged trimming, or a deckle-edged aperture made in a mounting card for cut-out mounting.—B.J., 1931, Feb. 27, pp. 122-123.

Dry-mounting with Resin Solution.—A method which is convenient for the mounting of prints dry makes use of a resin solution composed as follows :—

Powdered gum lac	333 gms.	6¾ ozs.
Soda carbonate, anhyd. ...	11 gms.	100 grs.
Borax	95 gms.	830 grs.
Water, to make	1,000 c.c.s.	20 ozs.

The solution is prepared by dissolving the carbonate and the borax in boiling water, then adding the gum lac and boiling gently for an hour on a water-bath.

In mounting, the dry prints are coated thinly and evenly on the back with the mounting mixture and allowed to dry. The mounting is done by pressure with a hot iron, a sheet of thick paper being laid on the print.—Rev. Fr. Phot., 1930, Dec. 15, p. 374.

Hanging Prints on Stone Walls.—An ingenious solution of the problem of hanging a display of photographs on the stone walls of the foyer of a theatre, in such a way that the walls are not damaged or marked, has been thought out by John Erith.

The points of four drawing pins were pushed through the sticky side of four pieces of adhesive tape, and the tape massaged firmly upon the stone walls so that the points of the pins protruded outwards. The four pieces of adhesive tape were spaced so that the pins would pierce the mount surrounding each print, without showing the tape itself. The protruding points of the pins were then protected by pushing gelatine jujubes or small rubbers fitted as erasers on the ends of pencils. —B.J., 1931, September 18, p. 568.

Tarnishing of Prints.—Following complaints concerning the "bloom" of old bromide prints, J. Brownhill recalls the use of encaustic paste for rubbing over a print to prevent this sort of deterioration. According to Eder a suitable paste can be prepared by dissolving together and well mixing 1 oz. of white wax, 200 minims of dammar varnish, and 1 oz. of oil of turpentine. Another paste consists of 2 ozs. of linseed oil mixed with 1 oz. of beeswax. This mixture is rendered fluid by heat and a very little of it rubbed lightly over the print. (B.J., 1931, Sept. 4, p. 535.) A chemical method of restoring bromide prints which have tarnished with age will be found on page 238 earlier in this volume.

The use of Vanguard "Vitrivene" varnish, into which the prints are dipped, is recommended as a positive preventive of silvering. The prints are dipped and dried, then becoming impervious to air or water.—B.J., 1931, Sept. 11, p. 540.

LANTERN SLIDES.

Squareness in Printing.—Many lantern slides have been ruined by printing the image slightly out of square with the edges of the plate. A sure method of avoiding this, when using one of the special lantern-slide printing frames, is to prepare a cover-glass by ruling it off in squares with Indian ink lines placed exactly parallel with the edges of the plate.

When the negative has been inserted in the frame this cover-glass is slipped over it, and by looking through at the safe-light one can tell at a glance whether the negative is correctly placed in the frame under the square aperture for the lantern plate. If the position is found correct, the ruled cover-glass is removed, the sensitive lantern plate put in its place and the exposure made.—A.P., 1931, August 12, p. 154.

Coloured Advertisement Slides.—The making of coloured transparencies for use as advertisement slides in the cinema hall has been described by L. G. Sandys. In this branch of work it is of the utmost importance to obtain the maximum degree of clearness and brilliance in the lantern slide, and also to reproduce the (usually) vivid colouring of the original.

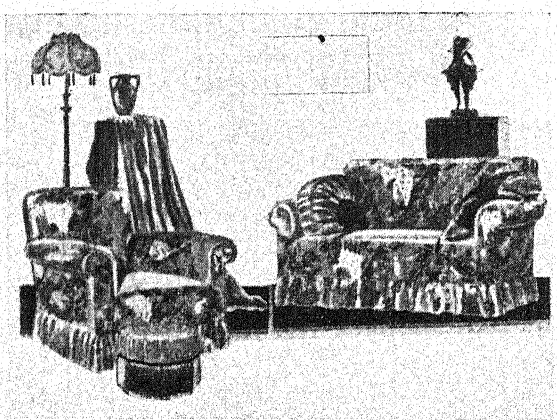


Fig. 1

It is required, for example, to produce a lantern slide (fig. 2) in which appears a coloured representation of an original colour picture (fig. 1). Make a copy negative of

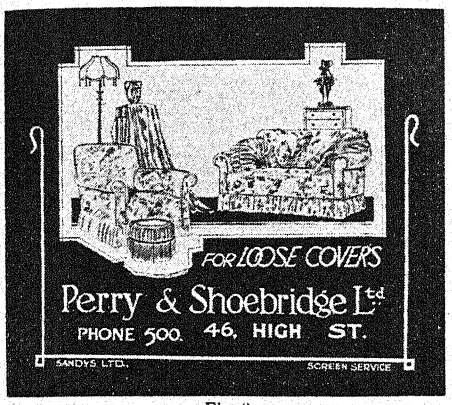


Fig. 2

this picture, on ordinary commercial film if desired, and from it make a very light, whole-plate enlargement on matt paper. When the print is dry, draw round the outlines of the image with lead pencil and draw in any border that may be desired. The pencilled print is then bleached out with Farmer's reducer so that only the pencilled drawing remains. The dry print is then cut out to shape and pasted on to a black or a white card, and any necessary design or lettering added (fig. 2).

From this a slide negative is made on process film or Kodaline paper, with the best possible contrast. From this the slide is printed, fairly lightly, with glass-clear whites. Any trace of veil is then removed by a moment's immersion in Farmer's solution, and the slide thus properly cleared is brought to full "soot-and-whitewash" contrast by intensifying with mercury and ammonia.

The slide when dried is ready for the final colouring. The presence of the outline image makes the colouring easier, but the absence of shading means that the colourist must copy the original as exactly as possible in introducing the shades of tones.

When colouring a fairly large space it is best to wet the surface slightly with water so that the colour shall "take" evenly. Then the first dilute charge of colour is applied, allowed to dry, and another charge run on. It is easier to get just the right strength combined with even tint in this way. When all the colours have been applied it is often possible to improve the effect very much by picking out one or two parts with a fairly heavy charge of colour.—B.J., 1931, Aug. 21, pp. 500-502.

NEGATIVES FOR COLOUR PRINTS.

Colour Separation Sets.—The requirements which must be fulfilled by a set of colour-separation negatives for three- or four-colour printing (the latter with grey printer) have been defined by L. W. Oliver, as follows, assuming a neutral grey wedge, such as the Wratten copyboard chart or the reference object advocated by Colour Photographs (British and Foreign), Ltd., has been included in the subject and arranged so as to receive good general illumination :—

(1) Four equally-exposed negatives with shadows well exposed—no clear glass. The exposure should be judged from the neutral wedges and not from the general character of the negative.

(2) The contrast of the four negatives should be equal. This again can only be judged by the neutral wedge.

(3) The contrast of the negatives should be such that a good reproduction of the original wedge is obtained when printed on a good normal bromide paper.

(4) The negatives must be of identical size.

(5) Fog, lens flare and halation must be avoided.

(6) The negatives must be evenly developed.

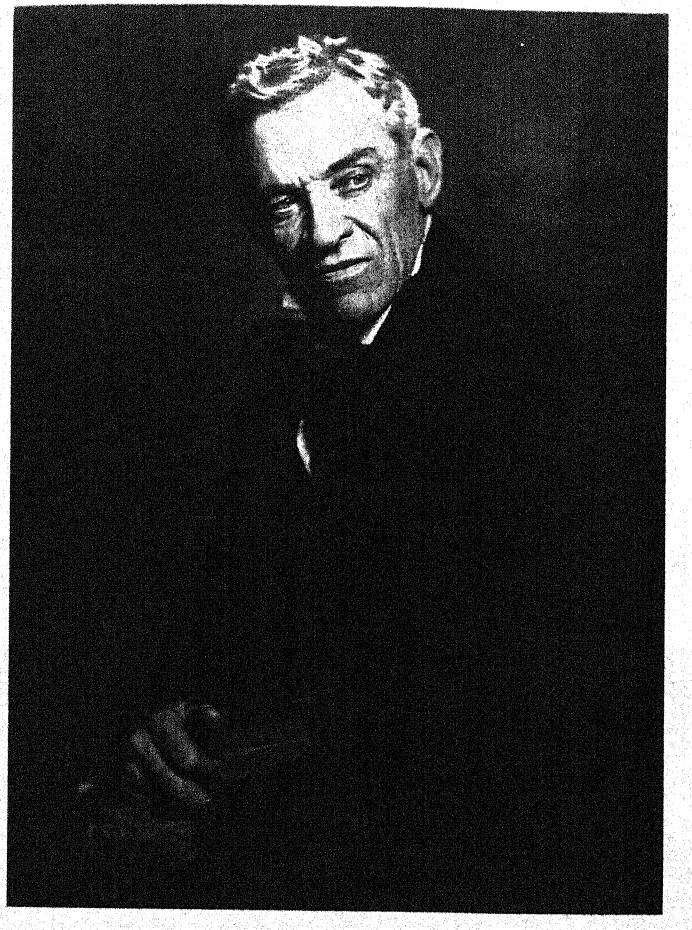
(7) The negatives must be thoroughly fixed and washed and free from mechanical blemishes.—B.J., "Colour Photography" Supplement, 1931, May 1, pp. 17-19.

THE UVATYPE PROCESS.

Uvatype Dye Colour Printing.—Some important new factors in imbibition dye-printing which are employed in the patented Uvatype process of colour photography on paper have been discovered by Dr. A. Traube.

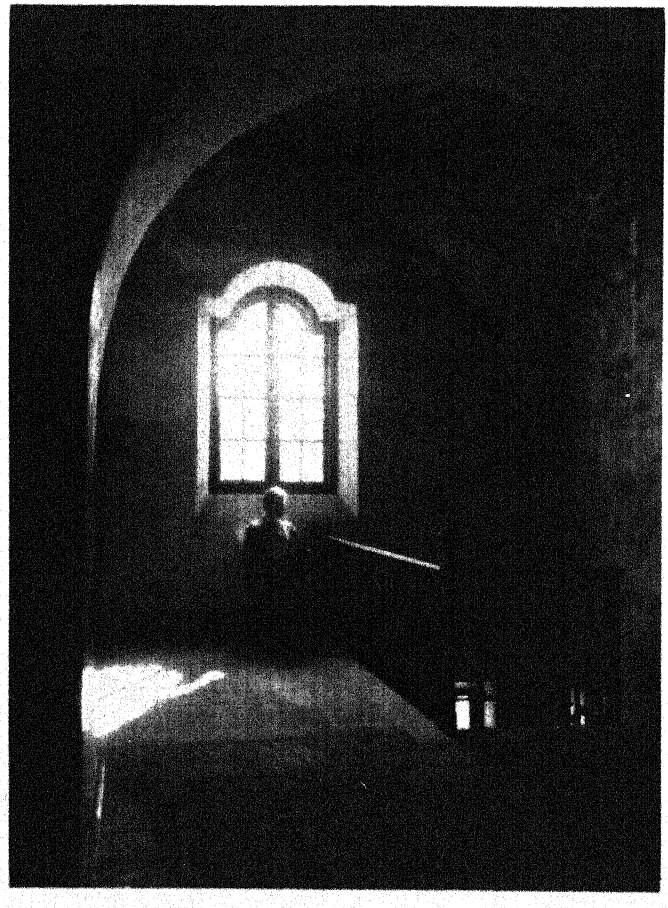
It has been found that the secret of satisfactory printing by dye imbibition lies in the properties of the dye solution used. The dye should adhere so firmly to the dyed relief that no trace of dye should bleed out during rinsing, yet it must transfer cleanly and regularly on contact with the gelatine-coated transfer paper.

This behaviour is shown by dyes having a definite degree of dispersity lying just about at the limit of molecular division, and consisting of particles of diameter 4mu. Such a dye solution can be separated by dialysis or ultra-filtration from the polydisperse solution of the Hoechst dye Pinatype Blue F. With such a dye fifty identical transfers are possible from one relief.



AUGUST KNAPP

DR. JULIAN SMITH



SACRED SOLITUDE — FLORENCE B. KEMMLER



INGA

JAN DE MEYERE

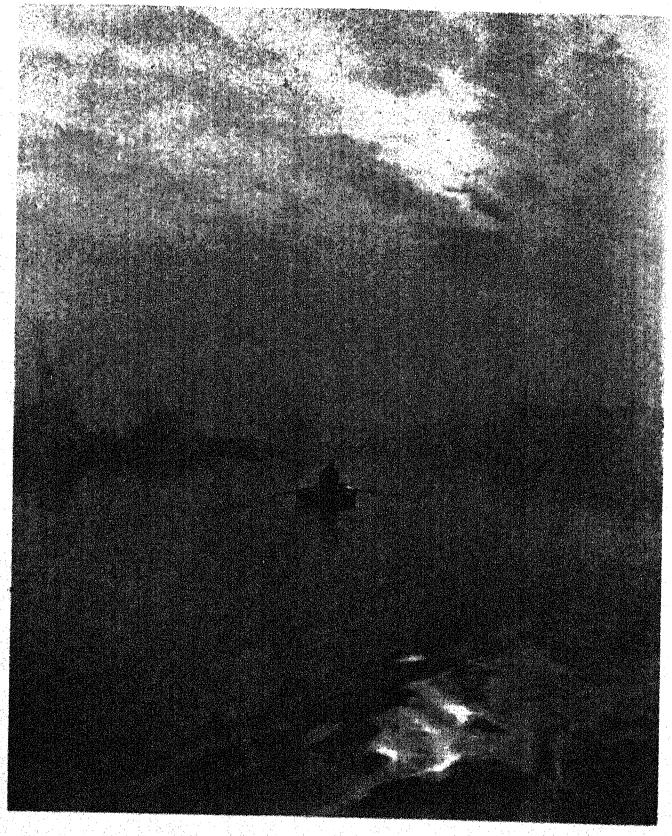


PEASANT WOMEN

J. O. ECHAGUE



THE VELVET HAT — CHARLES AYLETT

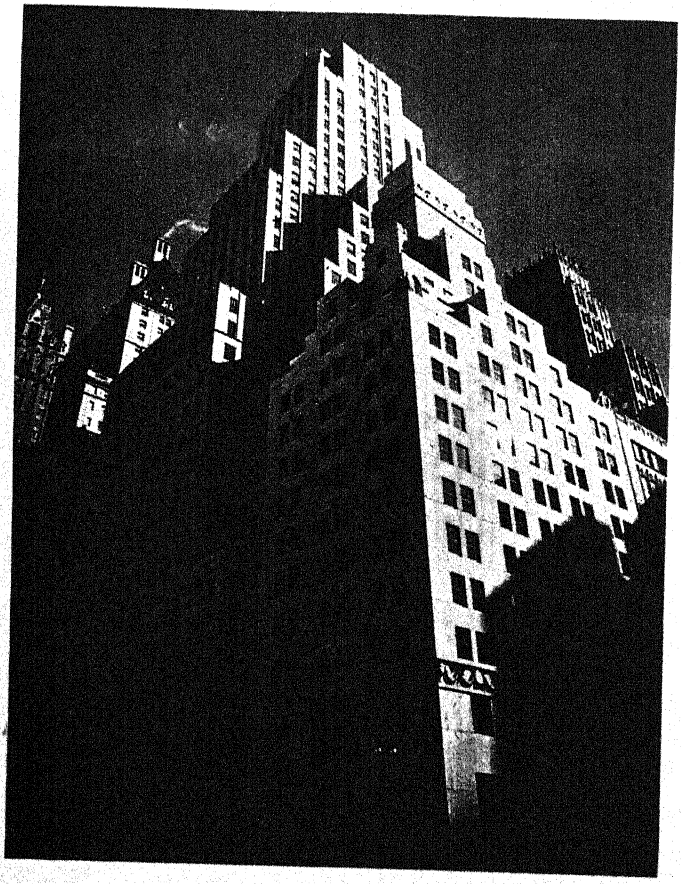


THE MYSTERY OF DISTANCE F. VAUDRY ROBINSON



KARIN LEIJONHUFVUD

JAN DE MEYERE

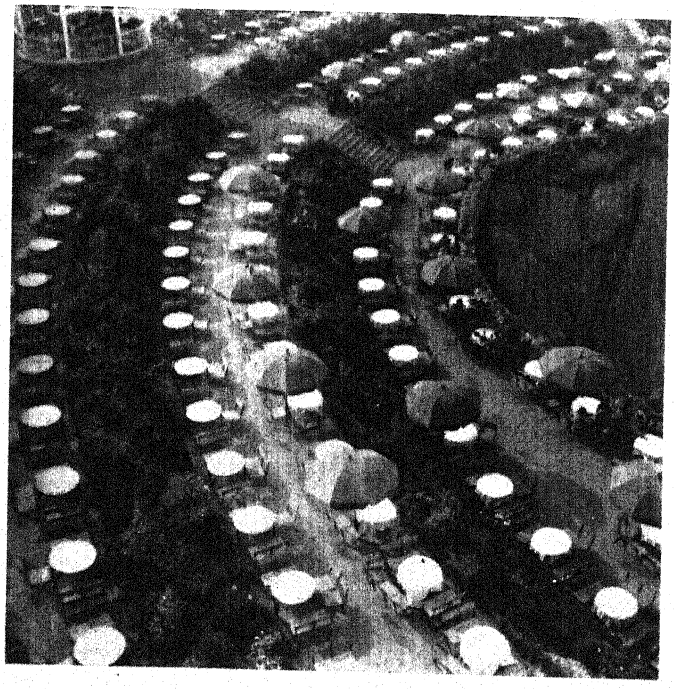


NEW YORK—THE PYRAMIDS

DR. D. J. RUZICKA



PORTRAIT OF MY WIFE — CHARLES BORUP



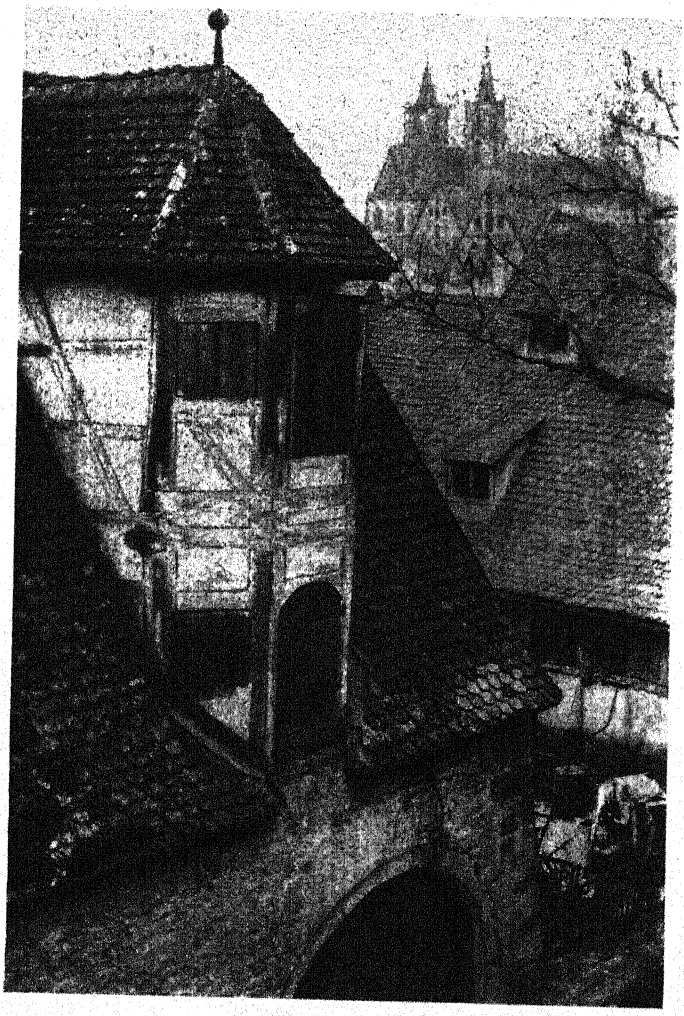
GARDEN CAFE

DR. JAN LAUSCHMANN



HIDE AND SEEK

A. F. KALES



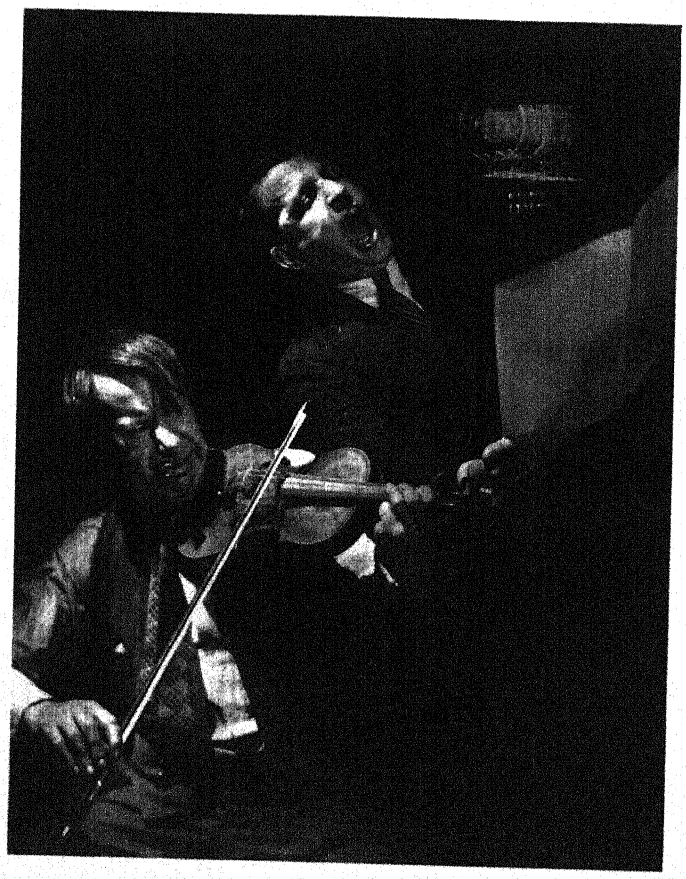
AN OLD GABLE, ROTHENBURG

JOHN ST. AUBYN



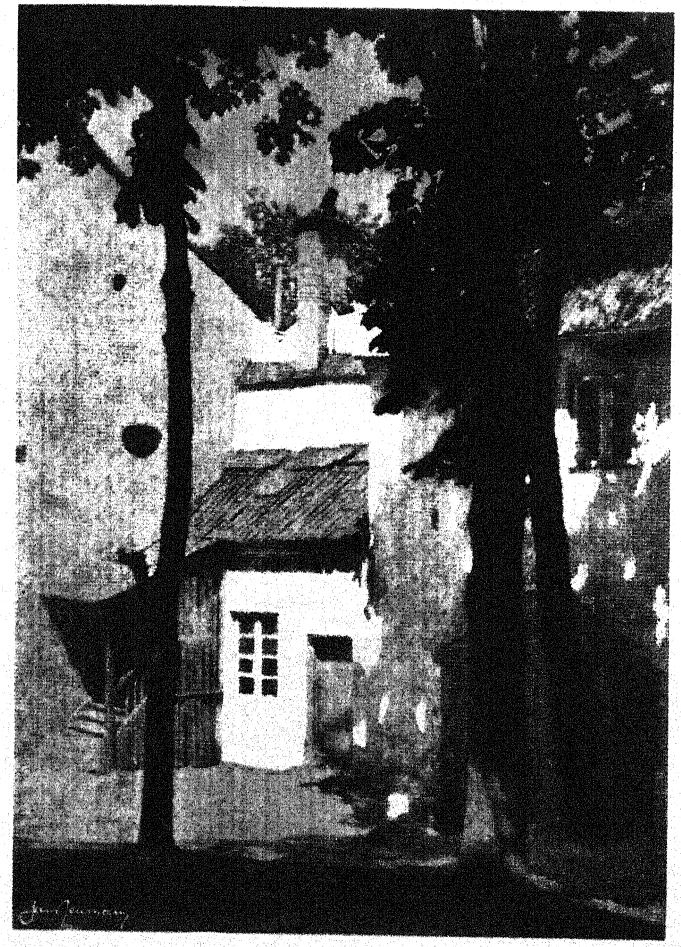
ROMANY CHAL

B. &. W. FISK-MOORE

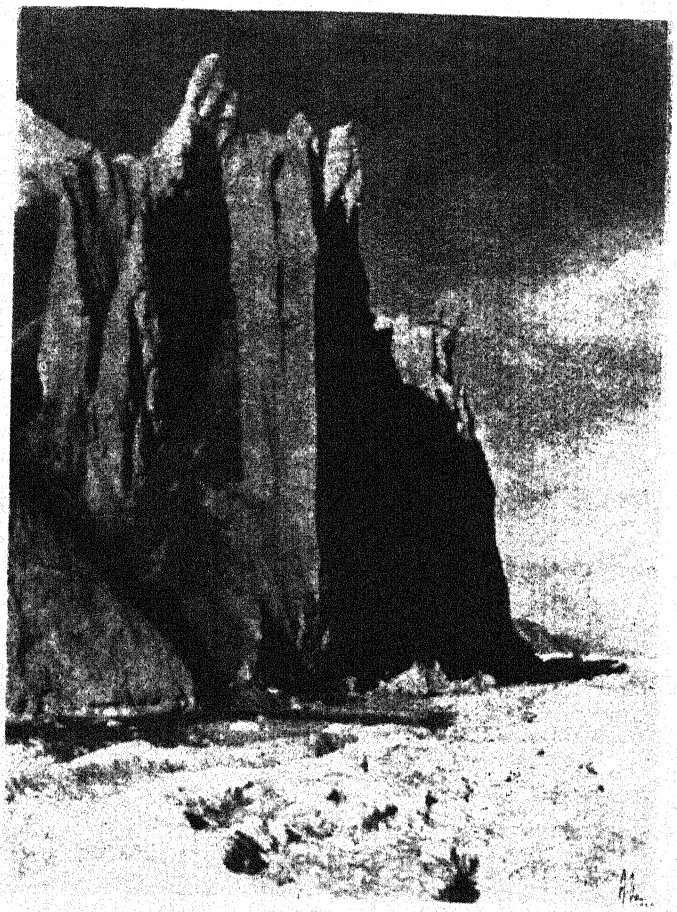


SYMPHONY IN BLAH

V. SARRA



FRAGMENT FROM WILNO JAN A. NEUMAN



WHERE MYSTERY LURKS

A. VAN

The other defect of imbibition printing is the tendency to give broad masses of shadow without differentiation of tone, when a number of prints are taken from a single relief. The cause of this is the condition of the upper surface of the relief in the shadows. With the repeated staining there is an accumulation of particles of dye at the openings of the capillaries, which are thereby choked so that very long contact with the gelatine paper is the only way of giving the shadows their full gradation.

The factor which interferes with continued dyeing and transfer is the clogging of the capillary passages of the gelatine of the relief by coarser particles of dye. A very simple method of freeing clogged reliefs from this adsorbed dye has been found; it consists in immersing the clogged relief for one minute in *distilled* water, in which gentle bleeding of the dye at once begins. Thus restored, the relief again gives transfers with perfect shadow tones. This treatment, however, is only effective with dyes which, as above specified, lie near the limit of molecular dispersion.

In the practice of Uvatype the colour-component negatives may, of course, be made by any of the known methods. However, the Uvachrom A.G., of Munich, has put two cameras on the market, a repeating-back camera, and secondly, a camera (constructed by the well-known Munich photographer, H. Traut), providing a small quick-change slide, which obviates the bulky and heavy sliding back and reduces to a minimum the intervals between the three exposures. The plates, provided with filters, are set one behind another in frames and after exposure fall into a magazine below on pressing a button.

The Uvatype process allows of the production of the positive intended for the wash-out relief either in the normal way with bichromated gelatine, or by means of a silver image. After developing with warm water the relief is dried and dyed up with dye solutions having the above-specified properties. For the blue picture the imbibition is absolutely automatic. When the blue image, which is always laid down first, is ready, the yellow image and finally the red follow in turn. The Uvatype process gives good scope for carrying out correction for defects in the negatives.—Phot. Korresp., 1931, Aug., pp. 30-32.—B.J. "Colour Photography" Supplement, 1931, September, pp. 34-35.

THREE-COLOUR CARBRO.

Single Bath Sensitiser.—Miss A. B. Warburg has found that the difficulties in three-colour Carbro are considerably decreased by the use of a single-bath Carbro "sensitiser," which she arrived at as a modification of a formula proposed by F. R. Newens.

In her experience single-bath "sensitisers" hitherto used give very fine detail, but entail great difficulty in obtaining an even wash of areas of colour and in making a series of similar prints; the two-bath methods, on the other hand, require greater care in manipulation and tend to give heavy results, and much more risk of frilling.

The new "sensitiser," which is recommended as having proved perfectly reliable in use (during a cold season), is made from the following stock solutions:—

A.—Potass. bromide ...	...	1 oz.	50 gms.
Potass. ferricyanide	...	1 oz.	50 gms.
Potass. bichromate	...	180 grs.	20·5 gms.
Distilled water ...	...	20 ozs.	1,000 c.c.s.
B.—Chromic acid ...	...	150 grs.	17 gms.
Distilled water ...	...	20 ozs.	1,000 c.c.s.

The working bath is made up as follows:—

Solution A ...	...	2 ozs.	100 c.c.s.
Solution B ...	...	2 ozs.	100 c.c.s.
Formaline ...	...	2 drms.	12·5 c.c.s.
Water, to make	...	20 ozs.	1,000 c.c.s.

Unless the bromide prints have been fixed in an acid fixing bath, they should, before commencing operations, be soaked for 3 minutes in a 3 per cent. acetic acid bath, and rinsed for 5 or 10 minutes.

The tissues should be dipped in clean water for 30 to 60 seconds, *not more*, and hung up to uncurl, whilst the working bath is prepared. The tissues are immersed singly in this bath for 30 seconds and applied to the bromides in the usual way. Five minutes will be found a suitable period to allow for bleaching. At the end of this time they can be passed through a 50 per cent. methylated spirit bath, and squeegeed on to celluloids, but this may be dispensed with if the waxed celluloids have been washed and dried before use. The squeegeeing is the thing of importance, a sustained firm and even pressure being necessary at all stages if frilling is to be avoided. The tissues on their celluloids are placed between blotters for five to ten minutes, and developed face

down, at a temperature of 106 deg. F. (supported by a glass stopper, knife rest, or similar object at either end), and finished in the usual way.

In hot weather it may be necessary to alter the amount of formaline, but too much is liable to insolubilise the tissues.

Reducing the proportion of B solution (chronic acid) by a quarter will increase contrast by darkening the deeper tints. Dilution of the working bath will give a generally darker result, and, conversely, lighter tints are obtained with a stronger working bath.

The bromide prints should be fairly vigorous, as this bath gives paler images than some others and a fine rendering of tones. Re-developed prints can be used again satisfactorily.

If this solution proves unsatisfactory in hot weather, the substitution of formaline by chrome alum (used as a further constituent of stock solution A in the same amount as the bichromate) gives a bath which has proved extraordinarily reliable, so long as the stock solution A remains fresh, *i.e.*, within, say, a week of its preparation.—B.J., "Colour Photography" Supplement, 1931, March 6, pp. 9-10.

Sensitometric Methods.—The value of simple density measurements in the control of the printing of three-colour negative sets in Carbro has been emphasised by Miss G. Geoghegan.

When a step wedge, or test scale of neutral greys, is included in the object, the scale of these tints should be exactly alike in all three negatives, but the range of the tones must naturally show a reduction to one-third, owing to the superposition of the three deposits in building up the grey scale in the colour print. At the same time, owing to the difficulty in ensuring absolutely neutral whites and neutral blacks in the test scale, exact correspondence is difficult to obtain.

To ascertain the printing scale of a set of negatives from these neutral tints, measure the highest and the lowest densities on each of the three step deposits, and subtract the sum of the lowest densities from the sum of the highest densities.

Let, for example, the highest density of the neutral strip be 0·7 for the red-filter negative, 0·6 for the green-filter negative, and 0·8 for the blue-filter negative. The sum of these is 2·1. The lowest densities are equal at 0·2, making a sum of 0·6 for the three. Subtracted from 2·1 this gives the range of 1·5, and a suitable paper for this range is normal bromide.

In exposures, however, it is the maximum density of each negative image (which may be greater than that of the step deposits) which must be taken as determining the required exposure for that negative.—B.J., "Colour Photography" Supplement, 1931, Feb. 6, pp. 7-8.

REVERSAL-DEVELOPMENT OF CINE FILM.

Without Exposure to Light.—A process has been patented by Kodak Ltd., and E. E. Jelley, in which the film is treated with a fogging agent after reversal. This simply renders the residual emulsion developable without exposure to light.

Suitable fogging agents are sodium hydrosulphite, methylene blue, hydrazine and hydrogen peroxide. Hydrazine, however, requires to be used in conjunction with formaldehyde, acetone or acetaldehyde.

The exposed film is first developed in an ordinary developer, *e.g.*, one containing equal parts of the following solutions :—

A.—Hydroquinone	2 ozs.
Sodium bisulphite	3½ ozs.
Formaline	2 ozs.
Water, to make	80 ozs.
B.—Caustic soda	2 ozs.
Potassium bromide	2½ ozs.
Sodium thiosulphate	15 grs.
Water, to make	80 ozs.

After washing for a minute the film is treated with a bleaching bath of acidified bichromate solution, again washed and then passed through the following clearing and fogging solution :—

Sodium sulphite	10 parts
Sodium hydrosulphite	2½ parts
Water, to make	100 parts

After rinsing, the film is finally developed in a caustic hydroquinone developer, as given above, washed and dried. —Eng. Pat., No. 341,183.—B.J., 1931, April 24, p. 346.

Reversal-Development by Inspection.—A method of reversal-development of Pathex 9·5 mm. reversible film claimed to give doubled speed and exposure latitude of 1 to 8 has been described by M. Garrigue.

The film is exposed in accordance with an integrating photometer and is wound for development on an ebonite drum dipping in a developing dish. The drum is kept rotating at 30 r.p.m. by means of an electric motor. The film is given

a first development, of from 4 minutes to 12 minutes at 72·5° F. in a paraphenylene diamine developer containing caustic lithia, but no bromide or desensitiser. It is rinsed for a few seconds, in white light, viz., a 20 c.p. bulb 10 ft. away, is switched on so that the rays fall perpendicularly on to the film. It is left washing under these conditions for 60 seconds. It is then reversed, by 80 seconds' immersion in an acid permanganate bath at 50-60°, and again washed for 60 seconds. Next comes a 30 seconds' clearing in a bisulphite solution, followed by 4 minutes' washing under the white light. Second development then follows, with the developer again at 72·5° F. and the white light falling perpendicularly. The image is allowed to blacken until the density and contrast are judged to be suitable. The film is then washed for five minutes, fixed for 2-3 minutes in a weak acid hardening fixer, washed for 10 minutes, drained and dried in a current of warm air just below the melting temperature of the gelatine. This visual judgment of the time of second development makes it possible for an experienced worker to remedy errors either of exposure or of the first development.—Rev. Fr. Phot., 1931, November 1, pp. 329-330.

DOUBLE TONING OF CINE FILMS.

Blue and Dye Colour Toning.—J. I. Crabtree and W. Marsh, in Communication No. 455 from the Kodak Research Laboratories, have described a method of two-colour toning worked out by them. It gives blue half-tones and shadows of purple or green colour according to the dye used in the second part of the process.

(1) Tone the positive film in the following:—

	Avoirdupois.	*Metric.*
Ammonium persulphate ...	3¼ ozs.	100 gms.
Ferric alum (ferric ammonium sulphate)	8½ ozs.	250 gms.
Oxalic acid	1¼ lbs.	600 gms.
Potassium ferricyanide ...	8½ ozs.	250 gms.
Ammonium alum	1 lb. 10 ozs.	800 gms.
Hydrochloric acid (10%) ...	6⅔ ozs.	200 c.c.s.
Water to	50 gals.	200 litres.

The method of compounding this bath is very important. Each of the solid chemicals should be dissolved separately in a small quantity of warm water, the solutions allowed to cool, filtered into the tank strictly in the order given, and the whole diluted to the required volume. If these instructions

are followed, the bath will be a pale yellow colour and perfectly clear.

Time of Toning.—Tone fully at 70° F. (21° C.). The colour of the toned image varies from a light bluish-grey for short time toning (about 3 minutes) to a deep blue for long time toning (10 minutes).

Time of Washing.—Wash for 10 to 15 minutes until the highlights are clear. A very slight permanent yellow colouration of the clear gelatine will usually occur, but should be only just perceptible. If the high-lights are stained blue, then either the film was fogged during development or the bath was not compounded correctly. Washing should not be carried out for too long a period, especially with water inclined to be alkaline, because the toned image is soluble in alkali.

If the acid is renewed to the extent of the original amount after toning each 5,000 feet, the bath is capable of toning 15,000 feet per 50 gallons of solution.

If, even after revival, the tone remains flat, the bath is exhausted, and should be thrown away.

After continued use, a slight bluish sludge will collect in the bath, but this is not harmful. Should this form to any appreciable extent, it is a result of incorrect mixing, the action of light, contact with metallic surfaces, or the presence of hypo in the bath.

(2) Immerse in a 10 per cent. solution of hypo for 2 to 3 minutes and wash for 5 to 10 minutes.

(3) Re-immerse in the above iron-toning bath for 5 minutes and wash for 10 to 15 minutes.

(4) Immerse in the solution of the basic dye for 5 to 15 minutes until the desired depth of colour in the half-tones is obtained. The formula for the dye solution is as follows :—

Dye	7 grs.	3·2 gms.
Acetic acid (glacial) ...	5 mins.	2 c.c.s.
Water to make	20 ozs.	4,000 c.c.s.

Dissolve the dye thoroughly in hot water, filter, add the acid and dilute with cold water. After toning, wash the film in water until the high-lights are clear or the half-tones are blue.

Dyes found suitable are safranine A (pink), chrysoidine 3R (yellowish-brown), and auramine (yellow) supplied by the National Aniline and Chemical Company, New York City. They produce purple, dark green, and green shadows respectively.—B.J., 1931, March 13, p. 150.



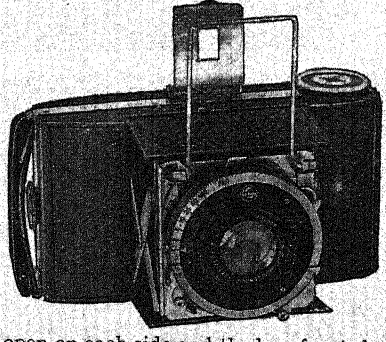
FOR STILL PHOTOGRAPHY.

(*Cine Requisites see page 316.*)

DALLMEYER DUAL ROLL-FILM CAMERA.

(Made by J. H. Dallmeyer, Ltd., 31, Mortimer Street, London, W. 1.)

The unique feature of this camera is that it is made to give negatives of actual size, $1\frac{5}{8} \times 2\frac{1}{2}$ ins., or $5 \cdot 7 \times 4 \cdot 1$ cm. It does this by taking the ordinary 8-exposure $3\frac{1}{4} \times 2\frac{1}{4}$ film and giving on it 16 images of half the standard size. The idea is thus similar to that embodied in the new 3×4 cm. cameras, but gives the extra advantage (in this country) of double-size negatives at exactly the same film cost.



The Dual is slightly smaller than $3\frac{1}{4} \times 2\frac{1}{4}$ cameras: it measures $3 \times 1\frac{1}{2} \times 5\frac{1}{2}$ ins. The front panel of the camera body divides down the middle, when a release trigger is pressed, the two flaps swing open on each side and the lens front shoots forward between into the extended position automatically. The lens panel is carried by crossed struts, two on each side, thus giving very rigid support: in addition provision for focussing down to 2 yards by radial-lever adjustment, follows by slightly altering the splay of these struts, with a perfectly rigid mounting of the lens and shutter on the panel. A feature of this design is that the camera can be closed down with the focus set to any near distance, and a touch on the trigger will instantly open the camera to this set focus. The lens is an $f/3 \cdot 5$ Dalmac anastigmat (3-ins. focus) in a delay-action Compur shutter. A well made wire direct viewfinder completes an admirable equipment. The price is £15 15s.

THE TUK DECKLE-EDGE PRINT TRIMMER.

(Sold by Sands, Hunter & Co., 37, Bedford Street, Strand, London, W.C. 2.)

A trimmer which gives a deckle edge to prints by passing them under a rotating circular blade provided with a slightly corrugated cutting edge is a new introduction. The cut is made by sliding the board on which the print is laid along a heavy metal base, the print being meanwhile held firmly down against the board. The board accommodates prints up to 10 ins. length, so that the apparatus will trim prints up to the dimensions of 10 × 10 ins. A stop at the end of the print board allows of the print being placed at right-angles to the line of cut. A stout celluloid strip is attached to the metal piece which holds the print in position during cutting, and thus the line of cut can be exactly chosen, whilst a series of ruled lines on the celluloid also allow of masked prints being trimmed to a definite and constant width of margin. The whole apparatus is most solidly built and works with excellent smoothness. The cutting wheel may be changed easily, to give various types of deckle effects or a plain straight cut.

A second deckle-edge trimmer in which a cutting blade is swung down on to the print, as in the usual straight-cut trimmers, is available at a lower price: in this case the irregular cut is obtained by means of a cutting blade with a serrated edge.

THE DALLAN SPEED PRINT AND POSTCARD WASHER.

(Made by David Allan, Whitfield Works, Mansfield Street, London, E. 2.)

In this apparatus, which is probably the simplest of all D. and P. print washers, a syphon is cleverly employed for the intermittent flushing of the washing tank. The tank is circular, is entirely smooth inside, and has a central syphon outlet inside an open mesh cylinder which keeps the moving prints away from this part. The water is admitted by means of a jet let into the wall of the tank, so that the water enters from a slit-like aperture and flows round the inner wall of tank. This swirling movement of the water is so strong that prints are carried round and round in the tank in continuous circulation.



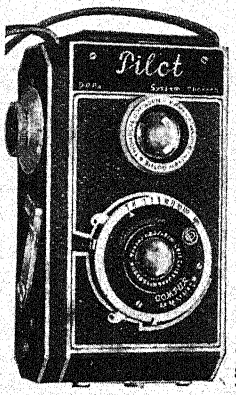
When the water reaches its maximum level and overflows down the central outlet, a syphoning action takes place and the tank is rapidly drained to half its depth, at which point the syphon is broken. The tank then re-fills. Beyond connecting to a tap with a rubber tube and turning the water on, this washer needs no attention of any kind. It changes its water automatically without any sort of mechanism or moving part to go wrong, and will go on working indefinitely.

Single washers, as illustrated, are made in diameters of 10, 15, 18, 24 and 30 in. at prices ranging from 12s. 6d. to £2 15s. A pattern in which two washers are connected to a single tap for simultaneous use is also made for D. and P. work, with 10 in., 15 in. or 18 in. washers, the prices being £1 10s., £2 10s. and £3 respectively.

THE PILOT MINIATURE ROLL-FILM REFLEX.

(Sold by Sands, Hunter & Co., Ltd., 37, Bedford Street, Strand, London, W.C. 2.)

This is a wonderful little camera taking sixteen 3 × 4 cm. pictures on a vest-pocket spool of film. Its extreme portability and the certainty with which every little picture can be seen and focussed will recommend it to the amateur who wants to get a result from every exposure, yet does not want to carry a bulky apparatus. The Pilot is a twin-lens camera. By the touch of a button the spring front moves forward into focus on distant objects and at the same time the little hood of the upper camera in which the picture is seen and focussed erects itself. For the focussing of nearer objects the front is extended further by operating a milled head, which is graduated in distances for focussing by scale if thought well. The camera is made to take oblong pictures when it is held vertically, but upright pictures may be sighted by means of a direct-vision finder mounted on the side. The film chambers are instantly accessible by sliding a catch on the bottom of the camera, whilst the film itself is moved on not by the usual winder, but by pressing down a lever, two operations of which move the film through the space of one picture. This lever likewise operates a counter which shows the number of exposures which have been made. The camera is constructed entirely of metal, measures 1½ × 2¾ × 5 ins. and weighs 18 ozs. Fitted with a 2-in. *f*/3·5 Tessar in Compur shutter the price, inclusive of leather case is £22 10s. Although the little negatives measure only about 1½ × 1¼ ins. they yield excellent enlargements of 10 × 8 ins. size, in which definition is remarkably good. The Pilot is most emphatically a de luxe miniature roll-film camera.



SCHNEIDER ANGULON F/6·8 WIDE-ANGLE LENSES.

(Sold by R. F. Hunter, Ltd., 40, Doughty Street, London, W.C. 1.)

In this new lens the firm of Schneider have not merely created a wide-angle lens working at a large aperture, but also one, the components of which may be used as normal-focus lenses.

The Angulon is remarkable amongst wide-angle lenses for its unusual evenness of illumination, which is noticeable even over a 10 × 8 with a 6½-in. lens at *f*/6·8. Reducing the aperture still further improves the evenness of illumination over a wider angle. Despite the very wide maximum angle covered by the Angulon, viz., 105°, it can be used for actual working at *f*/6·8. At this aperture the 6½-in. lens covers a whole-plate well enough for even commercial purposes. For this kind of definition over a 12 × 10 plate, the lens needs only to be stopped down to *f*/22. So much for the really excellent properties of the Angulon as a wide-angle lens.

The front element gives just over twice the focal length of the

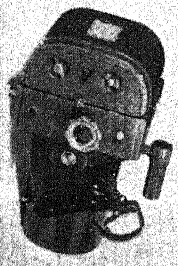
complete lens, and covers a 10 × 8 plate with pleasingly soft definition. The rear element is of focus about 1½ times that of the complete lens, and again covers a 10 × 8 plate. It can be used for groups or landscapes.

The Angulon is available in four focal lengths—3½ ins. (for ¼-plate), 4¾ ins. (for 5 × 4), 6½ ins. (for 8½ × 6½), and 8½ ins. (for 10 × 8), In standard mount the respective prices are £7 4s., £8 2s., £12 and £15 ; or £9 18s., £10 16s., £14 2s. and £18 in Compur shutters.

EAGLE AIRCRAFT CAMERA No. 3.

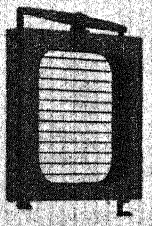
(Made by the Williamson Manufacturing Co., Ltd., Litchfield Gardens, Willesden Green, London, N.W. 10.)

For large-scale aerial surveys the famous Eagle automatic aero-cameras have an established supremacy. However, for many purposes of aerial photography it is advantageous to employ a camera which can be used in the hand for oblique aerial pictures, as for example for "pictorial" air-views of factories for advertising purposes, as well as for the automatic recording of a series of vertical pictures for map-making.



This dual purpose is fulfilled by the new Eagle No. 3 aero-camera, which though much smaller is a massive apparatus, about 15 ins. high, built up of aluminium castings which are assembled as so many units. The top unit is a magazine for 5 × 5 ins. roll film. This fastens on to the camera body, a unit containing the driving gear and housing an instrument box, being likewise self-contained. Under this is the lens cone, carrying the lens and shutter in readily detachable fashion.

The special features of the small Eagle camera are as follow. It takes pictures of size 5 × 5 ins. on roll-film, with 125 exposures to a single spool and with critical focus ensured by pressing the film against a plate-glass bed in the focal plane at the time of exposure. The camera can either be carried fixed in a vertical mounting in the floor of the machine or can be held in the arms over the side of the machine in a specially designed hand carrier with a release like a pistol trigger and a large direct view-finder. The camera can either be operated mechanically with an automatic electric control giving exposures regularly at set intervals, or it can be exposed when desired by electric contact, Bowden cable or direct hand release. In between the camera exposures a record can be taken, giving such



data as time, height, record number, etc., on the narrow strip left between successive images, by means of a momentary illumination of the instrument box. This latter carries a series of miniature Ross Xpres lenses which throw small images of the instrument dials on to the edge of the sensitive film. By means of interchangeable lens cones short-focus lenses (6 ins.) or lenses up to 10¼ ins. can be employed. A feature of this new camera which deserves special notice is the use of a behind-lens shutter of louvre pattern: it consists of eight thin steel strips fitting together and overlapping like a Venetian blind. By simultaneous rotation of all these strips so that only the thin edge is presented towards the lens, the shutter opens to make the exposure and closes again when the strips are turned back. This type of shutter gives an actual light efficiency of 80 per cent. at a speed of 1/200th sec., is more regular and reliable than a focal-plane shutter under survey conditions and has passed very successfully through exacting tests. This patented louvre shutter is the outstanding feature of an instrument which shows the marks of experience and mechanical ingenuity at every point.

In its simplest form, equipped for hand operation only, the Eagle No. 3 camera is priced at £95; with mechanical operation added, £125 15s.; with full automatic electric operation, £188; and complete with electric and mechanical operation and instrument recording, £232 5s., excluding camera lenses.

HELINOX 3 × 4 cm. ENLARGERS.

(Made by Zeiss Ikon, Ltd., Mortimer House, 37-41, Mortimer Street, London, W. 1.)

One of these self-contained electric box enlargers for making big prints from 3 × 4 cm. films is almost essential to the user of a 3 × 4 cm. film camera. Two patterns are made, one giving a × 2 linear enlargement (prints 3½ × 2½ ins.) and the other a × 3 linear (prints of size either 9 × 12 cm. or postcard). In each case the enlarger gives the enlarged prints with the same ease as a printing box.

The all-metal body completely enclosed, is in two parts, hinged together. The top portion is the lamp house, containing a 40-watt pearl bulb in a reflecting housing of aluminium: the light is thrown on to a sheet of opal, mounted in the base. In the working position this opal plate closes down on to a glass plate on the top of the main body, with the strip of film negatives sandwiched between. This glass bed with its carrier can be swung back against the bright opal plate for the exact adjustment of the film in the printing aperture. The lower pyramidal part of the body contains the *f*/6·3 Novar projection lens, and also a pull-out paper holder with a hinged mask to give an even white border. The lamp-house is well ventilated, and a switch on the lamp holder controls the exposure. A plug terminal and 5 ft. of heavily guarded flex serves to connect the apparatus to a lamp socket. While the Helinox is designed for exposures by electric light it can be used perfectly well for daylight enlarging, with the lamp-house removed. A simpler or more convenient appliance for making large prints from these very small films could not be desired.

PHOTO-BUTTONS AND MIRRORS.

(Made by the Universal Button Co., 13-17, Surat Street, Bethnal Green, London, E. 2.)

The service offered by this firm is the making of photo-buttons for wearing at political and association meetings or of mirror-backs for advertising purposes, both displaying photographic portraits or advertisement designs supplied by the customer. As the preparation of the photographic prints for this purpose is a special process this firm undertakes the entire production of the buttons or mirrors in preference to supplying the plant and materials for the photographer's own use. Examples of their work are excellent.

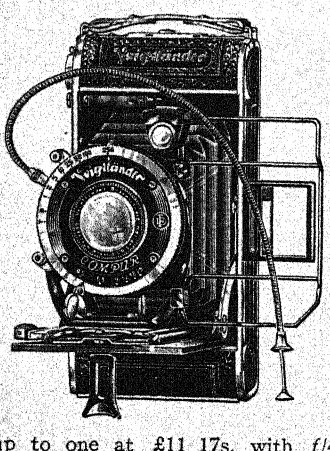
Photo-buttons, for display of a portrait when worn in the coat-lapel, are made in various diameters from $\frac{7}{8}$-in. to $1\frac{1}{4}$-in., at less than a penny each by the thousand, and can be turned out, if necessary, at very short notice. Pin, brooch or stud fittings can be supplied. Larger sizes can be supplied, very suitably in oval form if desired, either with a mirror-back or with an open back for mounting in a mirror frame.

Similar styles are largely used for advertising purposes, usually in the form of buttons of diameter about $2\frac{1}{4}$-ins., with a mirror back. Buttons of this kind made up with photographic advertisement matter on the front make a very effective style of publicity at a reasonable cost.

VOIGTLÄNDER INOS ROLL-FILM CAMERA.

(Sold by Peeling & Van Neck, Ltd., 4-6, Holborn Circus, London, E.C. 1.)

The " Inos " is in all respects but one the same as the de-luxe Voigtländer $3\frac{1}{4} \times 2\frac{1}{4}$-in. roll-film camera reviewed last year. The new feature is that it is made for use either as a $3\frac{1}{4} \times 2\frac{1}{4}$-in. camera in the usual way, or for taking twice the number of pictures of half the normal size (or, to be exact, of $2\frac{1}{8} \times 1\frac{11}{16}$-ins.) on the ordinary $3\frac{1}{4} \times 2\frac{1}{4}$-in. spool. For these latter a metal mask has to be placed in the film opening at the back of the camera. The direct-vision frame finder is modified to indicate correctly for both sizes of picture. We have no doubt that this facility for more economical photography on suitable occasions will be welcomed. With an *f*/6·3 Voigtar anastigmat in a three-speed shutter the Inos is priced at £5 14s.; other models are available, up to one at £11 17s. with *f*/4·5 Heliar and delayed-action Compur shutter.



CRITERION WARM-TONE PAPERS.

(Made by Criterion, Ltd., Stechford, Warwickshire.)

The Criterion Mezzotone and Vandyck warm-tone papers—the former an enlarging paper of practically the same speed as ordinary bromide, the latter a slower paper for contact printing—are already well known and highly esteemed amongst portrait and pictorial photographers. The former, particularly, has been made with so many attractive varieties of surface that few users could have expected more. Yet Messrs. Criterion have succeeded in adding to both the Mezzotone and the Vandyck series, a really different variety, distinctive and pleasing in surface, and obtainable in either white or cream tone. These new varieties—opal white and opal cream—are very aptly so described. The surface has no hint of sheen, and whilst distinctly rough to the touch has no broken or noticeably irregular appearance. Owing to its " tooth " this surface takes pencil or pastel colour exceedingly easily, so that these two new grades are specially adapted for artistic styles of portraiture which depend on a combination of handwork with the photographic image. Papers which give this facility, combined with the range of pleasing warm tones characteristic of Mezzotone and Vandyck, will be appreciated by great numbers of photographers. These two varieties are made in double weight only.

THE KODAK MODEL A PRINTER.

(Made by Kodak, Ltd., Kodak House, Kingsway, W.C. 2.)

The Kodak B printer—well known in D & P. establishments—was a machine designed for printing films of one particular size, the only means of adapting it for use with other films being by changing the complete platen.

This admirable printer has been followed by a further type, the Kodak A printer, which specially studies the needs of the smaller D. & P. man. It is simply the Kodak B printer so modified as to serve for all sizes of film up to postcard. Its single platen is instantly adjustable for film negatives of all the common sizes, and provides an arrangement of pure nickel masks, adjustable in size and with exact rectangularity of opening ensured. The adjustment for size is under the control of a micrometer mechanism, and the margin adjustment is cleverly arranged so that identical masking in a series of prints from one negative is assured, as well as uniformity of margin from side to side in individual prints.

The pressure pad, formed of metal plates covered with sponge rubber, does not provide for the numbering of the prints. Either film strips or separated film negatives are dealt with very conveniently, and as the pressure pad works through a full ninety degrees, the bed of the printer is very freely accessible for the insertion of paper or the adjustment of the negative.

The complete A printer costs £21 with treadle action, or £15 with hand-operation. In addition, the new adjustable platen may be obtained separately, price £10 10s., for use on the Kodak B printer, on which it fits interchangeably with the standard fixed-size platens.

THE TRILIKOP SMALL-FILM ENLARGER.

(Sold by Sands, Hunter & Co., Ltd., 37, Bedford Street, London, W.C. 2.)

This is an enlarging apparatus specially made for the user of one of the ultra-small film cameras. The largest negative it will take is 4 × 4 cm. film; other sizes for which it is adapted, by means of neat metal masking plates, are the Leica and the new 3 × 4 cm. film negatives. It is a vertical enlarging cabinet of fixed adjustment, set to give a 3-diameter enlargement—*i.e.*, prints rather larger than quarter-plate from 3 × 4 cm. films.

The wooden cabinet, about 2 ft. high, is arranged for the projection of an image on to a glass printing bed at the top. A well-ventilated lamp chamber in the base contains a single electric bulb placed under a 3 in. condenser. Above this is a wooden slide which carries adjustable film guides and a spring plate which secures the film in position and exactly masks one negative. Above is a second light-proof chamber, carrying at the bottom the projection lens (an *f*/4·5 Laack enlarging anastigmat) and at the top the printing bed on which the enlarged image is thrown in sharp focus. Three movable masking strips allow for any desired area of the picture to be "trimmed off" in printing, and a hinged pressure pad comes down to hold the sensitive paper on the glass. Thus the apparatus is fully light-proof and the paper is not exposed to the dark room light while the exposure is in progress. A switch on the top of the cabinet controls the printing light. The projection lens can readily be removed, for cleaning, through a door in the side of the printing box.

CELLOPHANE TRANSPARENT FILM.

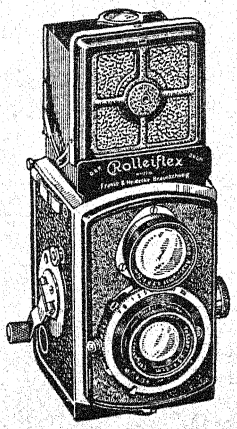
(Made by the Cellophane Co., Ltd., 6-9, Bird Street, London, W. 1.)

Cellophane tissue (familiar as a wrapping for innumerable articles) has important photographic uses as a protective covering for ordinary photographic prints which are to be subjected to much handling. Used as a facing to a photographic print Cellophane tissue in no way detracts from the clearness or distinctness of the print, yet effectively safeguards it against soiling or damage. As Cellophane consists of pure re-generated cellulose, free from special fire risks, it can be handled in photographic workrooms without regard to the regulations applying to the use and storage of celluloid: it ignites over a match rather less easily than newspaper and burns more slowly. A thin film of Cellophane can be united permanently with the emulsion of a photographic print merely by squeegeeing into contact when wet and drying together—by heat, if the print has been hardened—and thus the photographer has here a very easy and valuable method of preparing commercial photographs for display purposes, travellers' and salesmen's albums, computing and reference charts, etc. Prints faced in this way are protected against dirt and abrasion, against soiling by dust, oil or grease and against a damp atmosphere. Cellophane tissues, in thicknesses of from less than one-thousandth to just over six-thousandths of an inch, are sold in three large sizes (35½ × 39⅜ ins., 20 × 30 ins. and 17¾ × 19¾ ins.), in reels and in cut sizes.

THE SMALL ROLLEIFLEX ROLL-FILM REFLEX.

(Sold by R. F. Hunter, Ltd., 40, Doughty Street, London, W.C. 1.)

Like the larger Rolleiflex this new pattern is a reflex camera of the twin-lens type, but takes the ordinary eight-exposure vest-pocket film, using it for the making of twelve negatives each 4 × 4 cm.—just over 1½ ins. each way. With vest-pocket spools at a shilling each, film for the new Rolleiflex thus works out at one penny an exposure.



The new camera does not differ greatly from the standard Rolleiflex, though smaller and lighter. Of size 4¼ × 2½ × 3 ins., and weight 19 ozs., it is a camera that only just fills the palm of the hand. Constructed of metal almost throughout its body is of aluminium alloy covered with grained leather.

The difficulty that the eight-exposure numbering of the vest-pocket film does not fit in with the twelve-picture arrangement for which this camera is used is very cleverly overcome. The film is first wound on by sight in the usual way until the number "1" appears in the red window, and from this moment no further notice is taken of the figures on the film backing strip. Instead, after each exposure, a small handle fitted in the side of the camera, like a folding cranking handle on a miniature cinema camera, is turned as far as it will go in a clockwise direction, and then returns; this action winds the film on. As each movement is made, a numeral clicks over in an aperture to show how many exposures have been made. Moreover the stroke of this handle is each time reduced so that an exposed film shows the negatives exactly equal in spacing all along its length.

The Small Rolleiflex is most beautifully designed at every point to give a miniature roll-film reflex with the maximum certainty in use and quality of results. The extension allows for focussing down to about 3 ft. With *f*/3·5 Tessar as the taking lens and an *f*/2·8 Heidoskop anastigmat as the viewing lens, the Small Rolleiflex costs £19 17s. 6d.

ELEPHANT BROMIDE PAPERS.

(Sold by A. O. Roth, 85, Ringstead Road, Catford, London, S.E. 6.)

The range of Elephant bromide papers—products of the Dresden factories of Messrs. Kraft & Steudel—includes varieties covering all the grades of surface and tint usual amongst bromide papers. In addition to the normal series there is a special contrast grade, which gives very well gradated prints indeed, with rich velvety blacks. This grade is fast enough for enlarging by diffused light. The semi-matt is a surface very suitable for prints for reproduction, being perfectly smooth and with very good blacks.

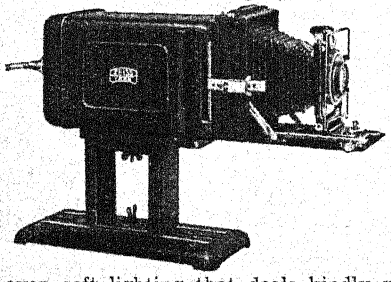
The Elephant Royal bromide paper is one of the most attractive of the series. It is a double-weight paper, very slightly rough in surface and with a slight sheen, giving prints of fine richness and particularly pleasing quality. It is made in normal and contrast grades, and with white or cream base. Metol-hydroquinone or Rodinal developers are recommended.

Another special variety is one for use with glazing machines. The feature of this paper is that the emulsion is specially prepared to obviate the need for glazing solutions. This paper has already proved popular amongst trade users.

THE MIRAX ENLARGING ATTACHMENT.

(Made by Zeiss Ikon, Ltd., Mortimer House, 37-41, Mortimer Street, London, W. 1.)

The Mirax is an attachment which converts a folding plate or film camera into an efficient enlarging projector. It makes use of the lens of the camera to project an image and of the camera bellows to obtain the necessary extension, but itself provides the necessary illumination and support. It consists of an all-metal base and sliding lamp-house, the latter aluminium-painted internally and containing a 60-watt pearl Neron bulb of special design. An opal diffusing screen fixed in front of the negative carrier gives even soft lighting that deals kindly with faulty negatives. The negative carrier, adapted for plates on one side and film negatives on the other, is very fully protected with velvet so that as at all other points, the lamp-house gives no leakage of light. Any 9 × 12 cm. or postcard camera can readily be fitted light-tight to the front of the attachment, where catches on each side allow almost any pattern of folding camera to be clamped firmly in position. For cameras of smaller size, a smaller loose frame is interposed, to give a light-tight join with either $4\frac{1}{2} \times 3\frac{1}{4}$, $4\frac{1}{2} \times 2\frac{1}{2}$, $3\frac{1}{2} \times 2\frac{1}{2}$ or $3\frac{1}{4} \times 2\frac{1}{4}$ cameras. Self-erecting cameras can be attached, but owing to their fixed extension give a fixed degree of enlargement except for the small variation permitted by front lens focussing. With other types the extension provided in the camera is the only limitation involved. The Mirax should greatly help to encourage enlarging amongst amateurs.



BARNET SILK-LUSTRE VERONA.

(Made by Elliott & Sons, Ltd., Barnet, Herts.)

This new variety of the famous Verona medium-speed warm-tone development paper is of card weight—white or cream—coated with a somewhat glossy emulsion, the surface of which is broken up by minute impressions of a honeycomb pattern. The effect is

a very artistic semi-gloss, and only on close scrutiny is the pattern of fine indentations perceptible. Thus something of the brilliance of a glossy print is obtained together with a much more distinctive and pleasing texture. The new variety gives, of course, the finely gradated pictures in black, warm-black or mezzo-brown tones for which Verona is noted, merely by the use of various metol-hydroquinone or amidol developers at normal temperatures.

LEICA INTERCHANGEABLE LENSES.

(Made by E. Leitz (London), 20, Mortimer Street, London, W. 1.)

The Leica camera, which takes 35 pictures of size 1 × 1½ ins. on a strip of unperforated cine-film, has as its standard lens an *f*/3·5 Leitz Elmar, of 5 cm. (2 ins.) focus. The focal-plane shutter however, allows the use of various lenses simply by exchanging the lens screwed into the body of the camera for another lens fitting the same thread. Four extra lenses, fitting in this way, are now made for the Leica, namely an *f*/3·5 Elmar of 3·5 cm. (1⅜ ins.) focus as a moderately wide-angle lens; an *f*/2·5 Hektor of 5 cm. (2 ins.) focus for conditions requiring a lens of extreme aperture; and two long-focus lenses, an *f*/4 Elmar of 9 cm. (3⅝ ins.) and an *f*/4·5 Elmar of 13·5 cm. (5⅜ ins.) focus, for portraiture and long-distance subjects. These additional lenses, which screw into the front of the Leica camera to give the exact "infinity" extension required and helical focussing down to 5 ft. or less, altogether give a very complete optical equipment. A new universal viewfinder, engraved to mark out the fields of the various lenses, is of the same direct-view optical pattern as the standard viewfinder and fits detachably on the camera.

THE BABY IKONTA 3 × 4 cm. FILM CAMERA.

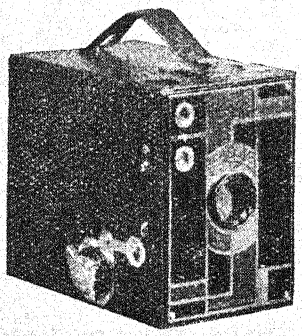
(Made by Zeiss Ikon, Ltd., Mortimer House, 37-41, Mortimer Street, London, W. 1.)

The Baby Ikonta is the last word in inexpensive miniature cameras. Its low price, automatic opening at the touch of a button, and neat and dainty construction are its strong points. Closed, the little camera is literally small enough to go into an ordinary waistcoat pocket: it measures 4 × 3 × 1 ins., and is neatly bevelled off at the ends. As a go-anywhere camera it can have few, if any rivals. A touch of a button on the side, and the baseboard springs down carrying with it the little Derval shutter, bellows and the little *f*/4·5 Novar anastigmat of 2 ins. focus. The shutter gives three instantaneous speeds ($\frac{1}{25}$-$\frac{1}{75}$th sec.), bulb and time, while rotating the front lens cell gives exact adjustment for focus down to 3 ft. The lens front is absolutely rigid. The body, of metal throughout, opens by swinging the back. The spring pressure plate, spring spool pins and the fine finish of the film guides show that the makers have spared no pains to make this a thoroughly efficient camera. A folding direct viewfinder is mounted on the side of the body. Taking vest-pocket roll-films and giving sixteen 3 × 4 cm. negatives the Baby Ikonta, with *f*/4·5 or *f*/6·3 lens is an ideal little camera for travel mementoes, diary snapshots or snapshot photography at its very cheapest.

No. 2 BEAU BROWNIES.

(Made by Kodak, Ltd., Kodak House, Kingsway, W.C. 2.)

A still better Brownie, and one far gayer and more handsome than any of its predecessors, comes from the Kodak factories. It strikes a new note by the use of a gaily patterned front, designed in two colours, with a decidedly "modern" effect, common to all the three varieties of finish—black, blue and brown—in which the Beau Brownie is issued.



The appearance is also enhanced by the exposed surface of the front component of the doublet lens which forms the standard equipment. Furthermore, this doublet lens is of larger aperture and shorter focus than the ordinary single lens. Thus the Beau Brownie has become a full inch shorter than the No. 2 Brownie taking the same size film ($3\frac{1}{4} \times 2\frac{1}{4}$ ins.), and correspondingly daintier and more compact in appearance. Its dimensions are $4\frac{1}{4} \times 4 \times 3\frac{1}{4}$ ins. Its equipment includes three lens stops, two brilliant view-finders and a shutter release trigger which works always in the downward direction. In either style of finish the new model costs £1 1s., with a leather carrying case to match at an additional 6s. Altogether the newcomer well merits its title of the "Beau Brownie."

LUMIÈRE FILMCOLOR COLOUR FILMS.

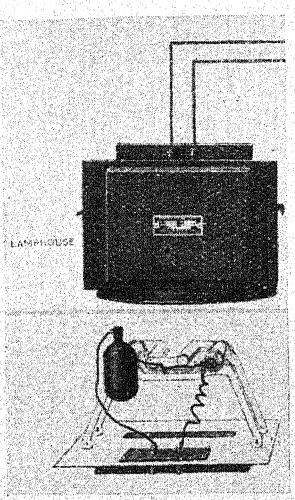
(Sold by Thos. K. Grant, Ltd., Polebrook House, Golden Square, London, W. 1.)

Filmcolor films—which may be described as the Autochrome colour plate in flat-film form—represent the successful outcome of long efforts in the Lumière factory to produce a cut film coated like the Autchrome plate with a colour mosaic screen and giving pictures in natural colours with the same ease and fidelity as the Autoochrome plate. Filmcolor films are exposed and developed in exactly the same way as Autochrome plates, the Autochrome filter being used for the exposure, and the results have just the same quality as Autochrome transparencies. These films give the advantages of a light, unbreakable material, easily sent by post and very convenient for travellers' use. There are the further advantages over the Autochrome plate that there is no need with this thinner material to make an allowance for displacement of focus, and as the films can be cut with scissors, transposing for stereo slides is much easier. Filmcolor films, mounted in cut film sheaths in the usual way, can be used in any dark-slide. Filmcolor films are sold, in packets of four, in all standard sizes from vest-pocket upwards at the same prices as Autochrome plates.

MERCURY-VAPOUR TUBES FOR ENLARGING

(Made by Hewittic Electric Co., Ltd., Walton-on-Thames, Surrey.)

As a light for enlarging, mercury-vapour is ideal on account of its great diffusion, evenness of illumination and constancy after having once been set going. The Hewittic Company has recently brought out a standard lamp-house for the Eastman Projector and Auto-focus enlargers, and suitable also for others. The employment of mercury-vapour light removes the one objection to the modern condenserless enlarger, namely, the length of exposure, particularly with the slower papers. Tests show that 5 seconds' exposure with the mercury tube is equivalent to 2 minutes with half-watt lamps consuming three times the quantity of current. Thus short exposures, saving in current, and in addition the reduction of retouching marks in the enlargements, are further factors in favour of the mercury light. The illustration shows, above, the lamp-house for the Kodak Unit, and, below, the method of fixing the tube in the lamp-house. The complete outfit, comprising lamp-house, tube and auxiliary, is supplied in Great Britain at the price of £11 8s. for use on any direct-current supply, of £13 15s. for operation on any 50-cycle alternating current.



THE "LITTLE WONDER" ROLL-FILM CAMERA.

(Sold by L. Trapp & Co., 61, Goldney Road, Paddington, London, W. 9.)

This is a remarkable little camera, namely one for vest-pocket pictures, constructed entirely of steel in the most rigid manner yet selling at the very moderate price of 15s. The instrument is the simplest conceivable in construction and use. Its outside dimensions are $4\frac{1}{2} \times 2\frac{3}{4} \times 2$ ins. approx., and its weight only $7\frac{1}{2}$ ozs. Access to the film chambers is obtained by unlocking and turning back the camera back, which is permanently hinged to the body. The little single lens is provided with two stops and with shutter giving one instantaneous speed and "time." There is direct-vision finder which folds into place on the side of the camera when not in use, whilst means for attachment to a tripod are provided by screwed bush let into the body. It is certainly an instrument which will stand any reasonable amount of knocking about and should prove very popular as a most inexpensive apparatus for a boy or girl starting photography and requiring a camera which, within the limits of the speed of its lens, will give good results.

POSTCARDS, BLOTTERS AND ADVERTISEMENT CARDS.

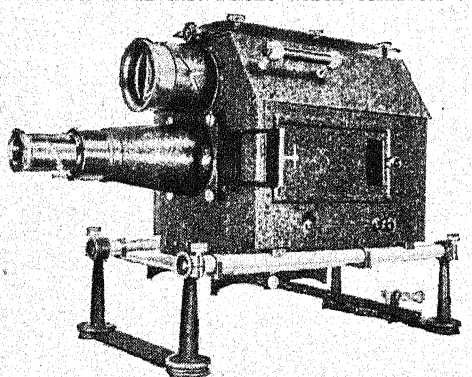
(Made by W. T. Cook, Acme Works, Chaldon Road, Upper Caterham, Surrey.)

The Acme photographic works are organised to give the most dependable kind of service in photographic printing in quantity for trade purposes. In addition to "real photo" picture postcards, including very superior sepia-toned cards with masked edges, lines for which special facilities are provided in this establishment are photographic blotters for publicity purposes and glossy advertisement cards for trade distribution. Some excellent examples of this sort which we have seen, comprising photographs of furniture and household equipment with brief details of specification appended, serve to show how well cards of this sort are produced by this firm. Double-weight prints, of size $5\frac{1}{2} \times 4\frac{1}{2}$ ins., or so, showing manufactured products perfectly "blocked-out" round the edges, faultlessly glazed and with lettering printed photographically in impeccable style, cannot fail to make a favourable impression at once on possible buyers into whose hands they may be put, and create the opportunity for the photographic illustration to tell its full story.

THE ROSS EPIDIASCOPE.

(Made by Ross, Ltd, 3, North Side, Clapham Common, London, S W. 4.)

In introducing an epidiascope, Messrs. Ross have applied their world-renowned mechanical and optical workmanship to the construction of an instrument which combines extreme convenience with the highest efficiency. It projects many kinds of subjects, passing from lantern slides to opaque subjects or printed originals as required merely by the movement of a lever.



Lantern slides are projected by means of a very large gas-filled bulb —500 watts or 1,000 watts— with a reflector separately mounted behind. In opaque projection ample reflection of light is obtained by providing reflectors, condensing lenses and side mirrors to throw a very powerful, even illumination on the object at the base of the lamp-house. The object is well protected from heat, partly by a plate of heat-resisting glass against which the original is pressed from below and partly by very efficient cooling by draught.

The blacked aluminium body of the projector is about 16 ins. long, 16 ins. high and 12 ins. wide, and is mounted on a table stand with a

pair of parallel-bar supports along which it slides, when necessary, to traverse a long, narrow original placed underneath. The lower part of the projector, for lantern slides, carries a 10½-in. lens and a metal slide carrier for either English or Continental sizes; the upper part, used to project opaque objects, carries a large anastigmat of 17 ins. focal length. Focussing adjustment and clamps are provided on both lenses. A useful refinement is the fitting of a movable metal pointer at one side inside the lamp-house, by means of which the lecturer can point out any feature of the subject without approaching the screen. When it is necessary to tilt the epidiascope to direct the picture on to the screen, even definition can be preserved by tilting the projection mirror inside the lamp-house, by means of the simple adjustment provided.

The Ross epidiascope has evidently been designed with expert knowledge of the requirements of this type of projector for educational use, and the result is a most satisfactory apparatus. The price is £35 10s.

SELO ROLL-FILMS AND PAN CINE FILMS.

(Made by Selo, Ltd., Warley, Essex.)

In referring to these new films, which extend the range of the excellent Selo film introduced in 1930, it should be pointed out that, as the result of the centralisation of the sales' side of the Ilford group of companies, all goods manufactured by Ilford, Ltd., and its subsidiaries are supplied only by Ilford, Ltd. In other words, orders for the goods known as Selo, Imperial, Illingworth, Wellington, Rajar, Apem, Gem, etc., are to be sent to Messrs. Ilford, Ltd., the goods being dispatched and invoiced by them. Thus, dealers have only one account in connection with their transactions with the various companies.

The two new Selo films are (1) a panchromatic film having the excellent colour sensitiveness of the Ilford panchromatic plates and also a double coating of emulsion, with consequent improved gradation; and (2) the latest Selo product, Selochrome roll-film, a film of much greater speed, more pronounced colour-sensitiveness, and with the further advantage of a double emulsion and the non-halation backing which plays so important a part in the sharpness and crispness of an amateur's snapshots. Mention should also be made of the addition to the Selo 16 mm. ordinary cine negative film of a panchromatic variety, which will be widely appreciated for its brilliant gradation, even when the light is not good, and for its greater sensitiveness by artificial light, thus contributing to the more widespread use of amateur cine cameras under conditions which not so long ago would have been regarded as impossible.

LEICA ENLARGERS.

(Made by E. Leitz (London), 20, Mortimer Street, London, W. 1.)

Three enlargers (all vertical) are now made for the "printing" of Leica negatives. All three are fitted with condenser.

The Filoy enlarger takes nothing larger than Leica negatives, has a 60-watt opal bulb and a 20-inch upright. It is fitted with

$f/3{\cdot}5$ lens of 2 ins. focus, and will enlarge up to any size from about $3\frac{1}{2} \times 2\frac{1}{2}$ ins. to 10×8 ins.

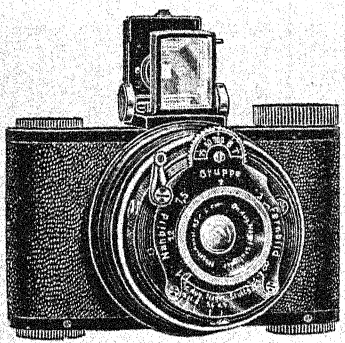
The Filyt takes film and plate negatives up to vest-pocket size and even these portions from a $4\frac{1}{4} \times 3\frac{1}{4}$ ins. negative. It has a 75-watt bulb and a 32-inch upright which allows the full printing size of 10×8 ins. to be used with Leica negatives. The lens is an $f/3{\cdot}5$ of 70 mm. (nearly 3 ins.) focus.

The Vitox is a larger model, capable of printing Leica negatives up to 18×15 ins. This enlarger is usually fitted with the same projector head as the Filoy, for Leica negatives only, but can be supplied with the Filyt head taking plate negatives as well. All these enlargers are fitted with very practical paper holders adjustable in position for the best placing of the picture on the paper.

THE NAGEL RANCA ROLL-FILM CAMERA.

(Sold by R. F. Hunter, Ltd., 40, Doughty Street, London, W.C. 1.)

The Nagel Ranca follows the Nagel Rolloroy in providing a miniature roll-film camera giving sixteen 3×4 cm. ($1\frac{5}{8} \times 1\frac{1}{4}$ ins. negatives on a vest-pocket roll film. It differs in its much lower price, resulting from its simpler construction and equipment.



The rear part, with its spool-holding frame which slides out sideways from the body, is the same as that of the Rolloroy. But the tubular extension of the latter, worked by a helical movement, is replaced by a rigid conical extension which projects, 1 in. forward from the aluminium body. On the front of this is carried the lens and shutter, with a further $\frac{1}{2}$-in. projection. The lens and shutter are also fixed, so that the assembly is completely rigid. Focussing, for distances down to $3\frac{1}{2}$ ft., is by means of a partial turn of the front lens component which affects the focus by altering the lens separation. The lens is an $f/4{\cdot}5$ Nagel anastigmat (2-in. focus) in a three-speed shutter. For the man who desires the convenience and economy of the miniature film camera, without the cost of the Rolloroy or other de-luxe model, the Ranca is an admirable choice. Its price is £6 12s.

THE FERGUSON SENSITOMETRIC SLIDE RULE.

(Made by the E.S.S. Colour Filter Co., 22, Bloomsbury Street, London, W.C. 1.)

That sensitometric data are of real value to the practical photographer and are themselves very easily grasped must be admitted; but those who are not experts in sensitometry find difficulty as soon as they begin to use these data. The trouble is that it involves

thinking in terms of logarithms, to which most people are completely unaccustomed. To get round this difficulty Mr. W. B. Ferguson, K.C., M.A., has designed, and the E.S.S. Colour Filter Co. has produced, a slide rule which carries out all sorts of sensitometric calculations by the movement of a slide against a series of fixed scales. It should certainly greatly help to encourage the use of these methods.

The slide rule, built up on cardboard, is 10 ins. long and 3½ ins. wide. The fixed portion of the slide rule carries on the left a scale of densities up to 4·0, and on the right speed scales in terms of H. and D. numbers and Burroughs-Wellcome exposure factors. The sliding panel carries three scales, one of candle-powers of the printing light, one of exposures in seconds at 1 metre from the printing light and a third of printing distances when the exposure is made by burning 2·5 cm. of magnesium ribbon.

Calculations which are easily carried out by means of this rule are those of exposures in printing; of speed of plates, films or papers; and of the candle power of illuminants. If, for example, the densities of negatives have been measured with an E.S.S. density meter, the relative exposures which various negatives will need under similar conditions can immediately be found; or, if the illuminant is of known candle power, the required exposure for any paper included in the speed tables in the Burroughs-Wellcome Diary can just as easily be read off on the scale. For determinations of speed of plates, films or papers it is only necessary to make an exposure under a step wedge, note the density which gives a just perceptible deposit and then refer to the slide rule for the inertia and the speed.

In this way the new slide rule, which is priced at 6s., greatly simplifies things for the photographer who wishes to systematise his work. With the E.S.S. density meter (£2 15s.) and the E.S.S. Fifteen-step neutral wedge (£1 5s.) it provides a complete outfit for sensitometric study.

ADAMS ROLL-FILM HOLDER.

(Made by A. Adams & Co., 24, Charing Cross Road, London, W.C. 2.)

A roll-film holder, suitable for any make of camera taking double wooden dark-slides, is a new Adams introduction. It works with any ordinary roll film—it does not require the varieties wound specially for roll-holders—and overcomes most positively any liability of the roll film to buckle out of the focal plane. For this purpose the new roll-holder is fitted with a glass front across the image area and a hand-operated pressure plate behind presses the film into contact with this glass at every point. Accuracy of register and focus is thus ensured with a certainty not always obtained in the exposure of roll-film. A further important point is that the exposed film is wound up in the normal way, with the red side of the backing paper outwards, so that no complications arise in the development of films exposed in this holder. Loading and operation are perfectly easy, and the construction of the holder—robust, precise and practical—guarantees long and faultless service. In 3½ × 2½ in. size (taking 3¼ × 2¼ in. films) it is priced at £8 10s.; other sizes can be made to order.

PRINTING FOR PHOTOGRAPHERS.

(Made by Hood & Co., Ltd., Sanbride Press, Middlesbrough.)

While Messrs. Hood continue to serve the photographers and others chiefly by the supply of view postcards, view albums and business stationery, designed and produced throughout in their own printing and photo-engraving works, certain of their new lines mark a notable departure from their usual printing styles. There is specially the designing of stationery or bill headings printed in photogravure and employing a pictorial heading made with the camera. Messrs. Hood's specimens show what an effective style this can be made, and since photogravure permits very tasteful reproduction even on newsprint and other of the cheapest grades of paper the cost is quite reasonable. This line of printing, as well as photogravure postcards, offers possibilities to which the photographer should be alive.



NEW DALLMEYER LENSES.

(Made by J. H. Dallmeyer, Ltd., 31, Mortimer Street, London, W. 1.)

A number of additions to the Dallmeyer range of lenses have been made in order to meet the demands of users of special patterns of cameras.

The Graflex camera is a case in point. A special $f/2{\cdot}9$ Pentac lens of focus $6\frac{1}{2}$ ins., fitting the Revolving Back Graflex Model C, is now available for owners who desire to add a lens of extreme aperture to this camera. In addition, the Dallmeyer Dallon telephoto lenses are now supplied in special mounts to fit all types of Graflex cameras.

Users of $3\frac{1}{4} \times 2\frac{1}{4}$ roll-film cameras and folding plate cameras, as well as of small reflexes such as the Ensign Speed Roll-film reflex, can now obtain the advantages of a large aperture telephoto lens by means of the new Dallmeyer Popular telephoto lens of 9-ins. focus. The extension required is about one half this distance. This lens, working at a maximum aperture of $f/6{\cdot}5$, gives negatives of very good quality without, of course, quite equalling the more expensive Dallon tele-anastigmats: the difference is that astigmatism is less completely corrected and more distortion tolerated. None the less, at £5 5s., this is a very useful and worth-while acquisition for the hand-camera user who cannot afford the best telephoto lenses. In its standard mount for a reflex camera this lens screws into a flange of internal diameter $1\frac{1}{2}$ ins. and has no projection behind the flange. Its forward extension is $3\frac{1}{4}$ ins.

BARNET SUPER PRESS PLATES.

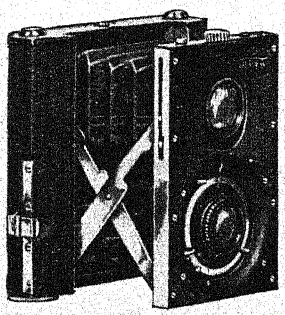
(Made by Elliott & Sons, Ltd., Barnet, Herts.)

This new Press plate from the Barnet factory, rated at 1,500 H. and D., is certainly a very fast plate indeed. With this extreme speed are combined the other qualities desirable in a Press plate, viz., quick development, fixing and drying, and ability to stand forcing without fogging. In fineness of grain this plate differs very little indeed from standard Press varieties of much lower speed. In its power of making the most of brief exposures under dull lightings the Barnet Super Press plate will help the pressman out of many of his difficulties.

PRIMARETTE TWIN-LENS ROLL-FILM CAMERA.

(Sold by A. O. Roth, 85, Ringstead Road, Catford, London, S.E. 6.)

In this camera the twin-lens type of construction is used in order to give the same advantages of exact view-finding and focussing up to the moment of exposure as found in reflex cameras, but without the use of a mirror. It forms an exceedingly neat and in some ways unusually practical design. As the illustration shows, the camera is made with two separate bellows, one above the other, extending between the camera back and the lens panel; the latter is carried by pairs of crossed struts at each side, the movement of which gives the extension to infinity by direct draw-out, and further extension for focussing by micrometer screw adjustment. The lower camera, with Compur shutter and *f*/3·5 Meyer Trioplan anastigmat, is the picture taking part the upper bellows, with its matched lens of identical focus and aperture, carries a ground-glass screen which serves for focussing and view-finding. The picture is visible on this screen before, during and after exposure. The camera is either held in both hands a foot or so in front of the eyes, or right against the cheek with a magnifier in position to enable the image to be viewed comfortably. A cable release serves for easy operation of the shutter.



The camera is unusually flat and compact when closed. It is 4½ ins. square, but only 1¼ ins. in thickness, so that it fits a jacket pocket really comfortably. Its weight is 20 ozs. only. It takes vest-pocket films, giving eight 4½ × 6 cm. pictures. A feature that deserves special note is that inaccurate view-finding at very short distances, which is the inherent defect of the twin-lens system, is cleverly overcome. As the lens panel moves forward to bring a close object into focus, the view-finding lens is shifted slightly downwards to make the necessary correction. At all

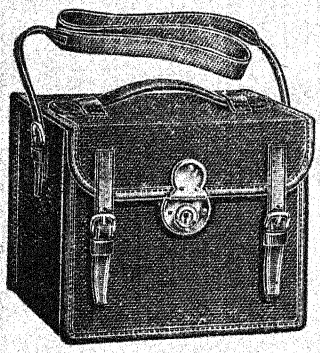
distances the field seen on the viewing screen is exactly included on the negative. The focussing movement, which extends to objects at 3 ft., works against a graduated scale so that the focus can also be set by distance.

The lower half of the camera back swings open on a hinge to give very easy access to the spool holders. The upper half contains a folded hood which erects as a hood for the focussing screen. At the two sides of this upper half of the camera are spare spool chambers, uncovered by the removal of the end plate, so that film for 24 exposures can be carried in the camera. Covered in finest morocco leather and manufactured in the very best style, the Primarette sells at £18, or at £21 with $f/3{\cdot}5$ Zeiss Tessar of 3-in. focus. A soft leather case for carrying the camera in the pocket costs 15s. 6d., or a cowhide sling case £1 7s. 6d.

WESTMINSTER REFLEX CAMERA CASES.

(Made by the Westminster Photographic Exchange, Ltd., 119, Victoria Street, London, S.W. 1.)

In these new London-made tan canvas cases users of reflex cameras are offered thoroughly serviceable, waterproof cases at a fraction of the price of leather cases. They are very stoutly made, lined with green baize, and fitted with lock and key, carrying handle and web sling strap. The canvas covering and the stiff reinforcing layers behind are very strongly sewn and leather-bound at the edges. There is a partition by which the camera and dark-slides (up to six single slides and film-pack adapter) are separately housed. In size to take $3\frac{1}{2} \times 2\frac{1}{2}$ reflexes these cases sell at 16s. 6d.; for $3\frac{1}{4} \times 4\frac{1}{4}$ ins., 19s. 6d.; and for $5\frac{1}{2} \times 3\frac{1}{2}$ ins., £1 5s.



PHOTOGRAPHIC GELATINES.

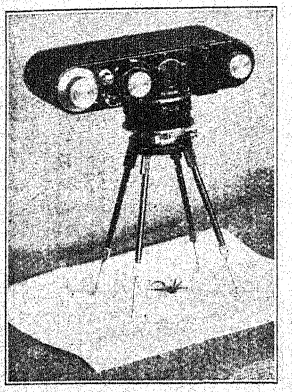
(Made by The British Gelatine Works, Ltd., 17, Wilson Street, London E.C. 2.)

Highly sensitive emulsion gelatines, suitable for photographic plates, papers, roll-film and cine-film are manufactured by this firm, which, under the name of C. Simeons & Co., has carried on this manufacture for over thirty years in their Luton factories. These works cover an area of about 10 acres, and comprise about 240 lime pits in which the raw materials for gelatines are first cleaned. The factory is equipped with the most up-to-date machinery and plant for the production of special photographic gelatines, and its products are now largely in use by photographic manufacturers in all parts of the world.

NEW LEICA ACCESSORIES

(Made by E. Leitz (London), 20, Mortimer Street, London, W. 1.)

The illustration shows one of the latest Leica accessories, a collapsible copying stand for holding the Leica camera vertically for photographing small objects. The legs of this stand define the field covered by the camera and are extensible to suit various subjects.



Other new accessories include a reflecting viewfinder to permit the Leica to be used at waist level; a viewing magnifier for the examination of the small negatives; a new range finder with a larger scale and fuller scale markings; a light-tight developing tank of material similar to Bakelite, which can be used in daylight once the film, together with its moulded celluloid carrier, has been coiled in the tank; and a series of long cable releases, up to 6 yards in length, for the operation of the camera from a distance.

AGFA SUPER-SPEED PORTRAIT FILMS.

(Made by Agfa, Ltd., Vintry House, Queen Street Place, London, E.C. 4.)

This film is a new and more rapid variety of the Agfa Portrait film, providing not merely increased speed, but also the equally desirable qualities of colour-sensitiveness, range of gradation and latitude in exposure. The Super-speed is not panchromatic, but only sufficiently short of this to allow of development by the customary red dark-room light.

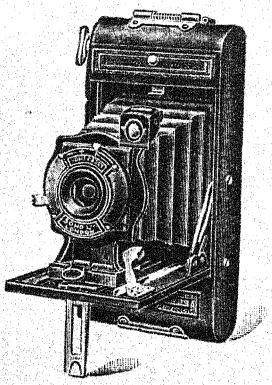
Test exposures ranging from $\frac{1}{2}$-sec. to 4 secs. showed in the resulting negatives the remarkable latitude of the Superspeed film. The negative which received the shortest exposure (half-watt lamps) was of soft brilliant quality and of just the moderate density for projection printing. The negative which received 1 sec. exposure could scarcely be distinguished from it, whilst those which had 2, 3 and 4 secs., although of slightly greater density throughout, were negatives which retained the scale of tones in an unmistakable manner. All five negatives were developed together for the same time. Latitude of this order means the full retention of delicate high-light tones when the film is exposed for shadow gradations: it is almost impossible to get blocked-up high-light densities which refuse to print.

The Agfa Super-speed is supplied with either plain (clear) back or with a matt back which readily takes pencil or other retouching. It is emphatically a film which will satisfy those who aim at the utmost perfection in portrait negatives.

SOHO-CADET FOLDING FILM CAMERAS.

(Made by Soho, Ltd., 3, Soho Square, London, W. 1.)

This new British film camera makes a striking departure from current fashions in the use of a moulded casing of synthetic material in place of wood or metal bodywork. A body with very nicely rounded outlines, exceedingly serviceable owing to the absence of leather coverings to wear away and at the same time very attractive indeed in its imitation of polished rosewood, has thus been made possible. It is a new style which is certain to have a big appeal.



The folding baseboard is strengthened on the inner side with a metal plate carrying the runners for the lens front. With the baseboard dropped, the lens front can be pulled out until it engages with the infinity catch. Further extension gives nearer focus. The pressed metal lens front, which, like the bellows, is finished in dull red to match the body, is very firm and carries a rotating brilliant finder.

The Soho-Cadet is made in $3\frac{1}{4} \times 2\frac{1}{4}$ in. size only. With single achro lens and time-and-snapshot shutter it sells at £1 5s., with *f*/6·3 Kershaw anastigmat of $3\frac{3}{4}$ in. focus in a three-speed shutter, £2 5s. Of size $3\frac{1}{4} \times 1\frac{1}{2} \times 7$ in. and weight 14 oz., the Soho-Cadet should prove one of the most popular of inexpensive folding cameras.

ELEPHANT GASLIGHT PAPERS.

(Sold by A. O. Roth, 85, Ringstead Road, Catford, London, S.E. 6.)

The complete range of development papers manufactured by the firm of Kraft & Steudel, of Dresden, is now on sale in this country. The papers include the Labo gaslight papers, Sidi warm-black gaslight papers and Akron warm-tone rapid gaslight.

The Labo papers are the ordinary gaslight papers usual for amateur prints. They are made with glossy or velvet surfaces only, though in white or cream, and in paper or card weight. The emulsion is hardened so that prints can be passed through glazing machines without special treatment. Four grades of contrast are offered, all equal in speed. Labo papers are thus specially suitable for the amateur printing trade or for amateur use.

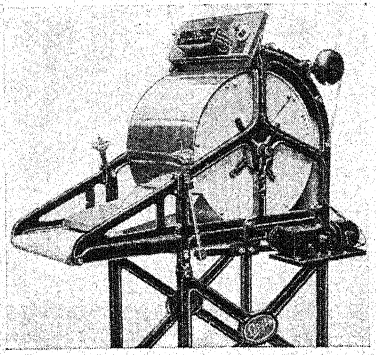
The Sidi papers are intended for more distinctive effects in gaslight printing. The image is warm black, and the surfaces available are glossy, cream semi-matt and velvet (white), all on paper or card base and in three grades of contrast.

The Akron Portrait gaslight papers are specially for professional use. The cream smooth matt variety, for example, gives very pleasing portraits in rich brown by means of the Elephant toning bath.

THE ENSIGN SUPER-GLOSS DRYER.

(Made by Ensign, Ltd., 88-89, High Holborn, London, W.C. 1.)

This new D. and P. machine is a rotary print dryer having a capacity for about 1,500 3¼ × 2½in. prints per hour, supplied at the price of £75. It is a very nicely designed rotary dryer, having a special type of drum and direct enclosed drive from a small electric motor. The drum, of diameter 24 in., and width 18 in., is made by special methods of nickel and chromium plating on a copper base. The resulting surface is claimed to be incorrodible and untarnishable, and needs only daily cleansing with turpentine. It gives very high gloss and eliminates sticking.



The conveyor band runs only half-way round the drum, and for the rest the drum with the attached prints is exposed to the air. Postcards and heavyweight papers can be handled as satisfactorily as thinner bases, while all papers, whatever their surface, can be dried satisfactorily, with or without glazing.

The drive, by small electric motor, is conveyed directly to the shaft of the drum through a reduction gearbox running in oil, with a normal (but variable) speed of one revolution in five minutes. The drum (in its electric form) contains three 500-watt heating elements, consuming one unit per hour after the first heating up.

The conveyor band is carried over metal rollers, and is automatically kept in correct tension by means of a weighted jockey roller. After passing the top point of revolution the drying prints fall into a basket just above the loading point for the conveyor. A gas-heated model is obtainable at the same price.

STUDIO BACKGROUNDS.

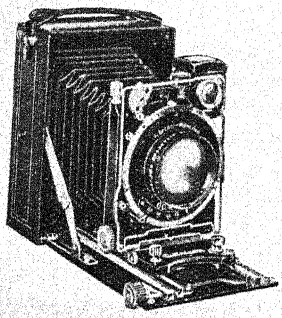
(Made by the Altrincham Rubber Co., 2-4, Kingsway, Altrincham.)

A series of painted studio backgrounds, of size 8 ft. square, is a new introduction by this firm for portrait photographers. Twelve designs, some giving landscape settings, but the majority, dignified interiors, allow the individual photographer a good choice of style of background. Several of the backgrounds include areas of plain or clouded colour large enough to permit of the simplest backgrounds in head-and-shoulder work with the choice of a more ornamental whole for full lengths or groups. The photographer whose taste is for a more imposing background, with a suggestion of opulence, can equally well meet his needs from other designs taken from the stairways or suites of a mansion. The price of each background is £2 2s.

F/2·9 CHALLEY FOLDING PLATE CAMERA.

(Sold by the Photo Trading Co., Ltd., Change Alley, Sheffield.)

A 3½ × 2½ in. folding plate camera with merits quite its own has been introduced as the Challey by this well-known Sheffield firm. The camera is fitted with *f*/2·9 Xenar anastigmat of 4½ ins. focus in a large Compur shutter of the delay-action type. This combination of lens with a shutter giving a full range of slower speeds makes this camera extremely useful for many kinds of action subjects and snapshot work at all times.

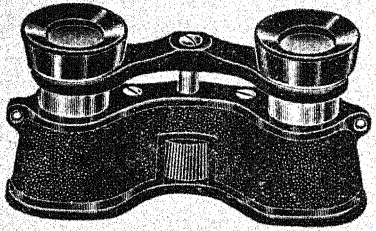


The camera gives a full double extension, over 9 ins., rack rise of front of a full ½-inch and cross front by screw control, and the lens support is perfectly rigid. Brilliant and wire-frame finders, and a small spirit level, are fitted. Two unusual refinements are the bayonet-joint for the lens front, so that the lens (with shutter) can be removed in a moment and replaced, by another, and a very neat and quick clip-on fixing for the focussing screen and dark-slides. The dark-slides are unusually easy to load, the plates being merely laid in and held down by a hinged spring clip. The price of the Challey with 3 slides is £11 15s.

KERSHAW THEATRE GLASSES.

(Made by Soho, Ltd., 3, Soho Square, London, W. 1.)

In the "Bijou" theatre glasses, a product of the Kershaw factory in Leeds, the playgoer is offered a very attractive type of opera glass at a modest price, namely £1 5s. The notable fact about these glasses, apart from their compactness, is that the front glasses, and with them the field of view, are not circular, but oval, with the larger axis horizontal, to give the wider angle of view across the stage that is required for easily following the action at various parts of the stage. In addition, these glasses are made with a neatly moulded one-piece leather-covered body, with a central screw adjustment for focussing. The optical elements are securely mounted and give just the brilliant, low-power magnification which makes a pair of glasses a valuable aid to the theatre-goer. Only 3½ in. long and 4 oz. in weight they are very convenient miniature glasses for theatre use.



ROSS TELEROS FOR THE LEICA.

(Made by Ross, Ltd., Clapham Common, London, S.W. 4)

The introduction of a special form of the *f*/5·5 Re[los] fitting the Leica brings to the user of this camera the a[dvantage] of one of the finest of telephoto lenses. This lens is ma[de] an equivalent focal length of 4 ins., so that pictures are on the scale (linear) of those given with the standard *f*/3·5 lens. [It] is supplied in a special iris focussing mount which fits interchangeably with the standard lens, and is supplied with a finder and mask specially made for the camera. The pictures which it gives show a degree of minute definition which will delight Leica enthusiasts. The price is £8 10s.

SMALL-FILM PRINTING BOX.

(Sold by Sands, Hunter & Co., Ltd., 37, Bedford Street, London, W.C. 2.)

A printing box is here provided, designed for the contact printing of very small film negatives—3 × 4 cm. and smaller—in strips of up to four positives at once. It is a fairly large wooden box (8×8× 11 ins.) carrying three electric lamp sockets in the base, ground-glass diffusing screen, glass printing bed and a flat pressure plate that pivots down on to it. The uncut strip of film negatives is passed between spring rollers and adjustable guides at each side of the box, across the bed plate, which is long enough to cover four of the images on a 16-exposure 3 × 4 cm. film. A set of cut-out masks, containing four apertures and sliding strips to allow of exact masking of the several negatives simultaneously, allows the printer to be adjusted for use with other miniature films. A switch on the top of the box controls the printing light. The facility for making ready-masked prints, four at a time, means very expeditious work for the small-camera user.

STONEWARE DEVELOPING TANKS.

(Made by the Hathern Station Brick & Terra Cotta Co., Ltd., Loughborough, Leicester)

Stoneware tanks in the tall form required for the development of roll films in long strips are a speciality of this Midland firm. For the D. and P. trade they supply a stoneware tank grooved across the top to carry six rods of films and deep enough to accommodate all roll-film lengths: the tank is 3 ft. 6 ins. deep and 8½ ins. square in cross section (inside measurements). Its capacity is therefore approximately 10 gallons. As each rod carries three 3¼ × 2¼-in. films the tank can be loaded with eighteen films of this size at once, or with about the same number of films in mixed sizes.

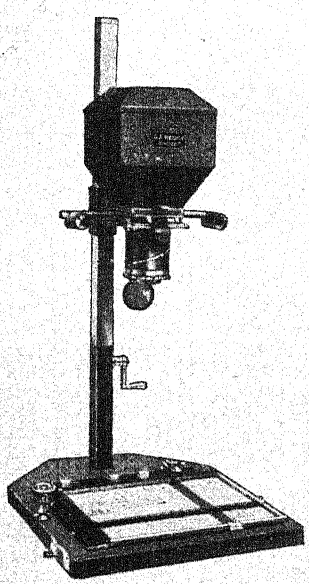
The tanks are of dark brown stoneware, are well glazed inside and out, and are provided at the bottom with a stoneware tap for the removal of exhausted developer and for flushing of the tank with clean water.

These tanks may be strongly recommended for holding D. and P. developing and fixing solutions. They are supplied, carriage paid, to any railway station in England, Scotland or Wales, at the price of £2 11s. 6d. each.

THE KRAUSS SMALL-FILM ENLARGER.

(See A. O. Roth, 85, Ringstead Road, Catford, London, S.E. 6.)

A 3½ × 1-film enthusiast could desire no more luxurious enlarging has been than is here provided for him. The negative-holder firm. 5t-pocket and smaller negatives) and the paper-holders are both beautiful examples of mechanical design. The negative holder which allows strips of negative film to be used in uncut lengths, includes finely cut metal masks in assorted sizes (4 × 4 cm., 3 × 4 cm. and 24 × 36 mm.) and provides means for pressing the negative between two small plates of optically worked glass when the required image has been correctly adjusted. The paper holder, with automatic guide for placing the paper and masking it, and with means for moving the holder to any part of the printing board and fixing it in place, is of first-rate design.

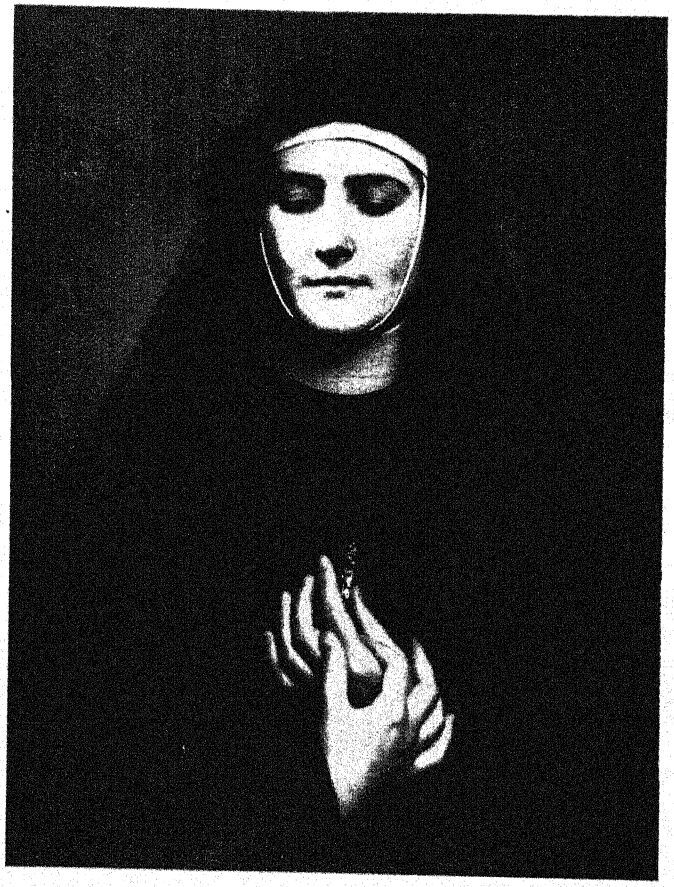


The lamp-house, with 60-watt pearl bulb and Meyer condenser, is carried on a pillar, with a worm screw for raising and lowering. At maximum height of about 3 ft., it allows 10 × 8-in. enlargements. The lens, an *f*/3·5 Meyer anastigmat, is in a focussing mount. To allow focussing to be carried out on the sensitive paper itself an optically worked red filter is mounted in front of the lens and passes an image showing unimpaired definition. The apparatus is of such high standard, that in film studios and commercial establishments where these small films are used for special purposes this enlarger will be invaluable. An advantage in this work is that the adjustable paper holder is made interchangeable with a series of fixed size frames more convenient for commercial printing. The enlarger, is priced at £16 10s. Extras are: red filter, £1 10s.; mechanical paper holder, £4 16s.; fixed frames (3½ × 2½ ins. to 5 × 7 ins.) at prices ranging from 13s. 6d. to £1 13s.

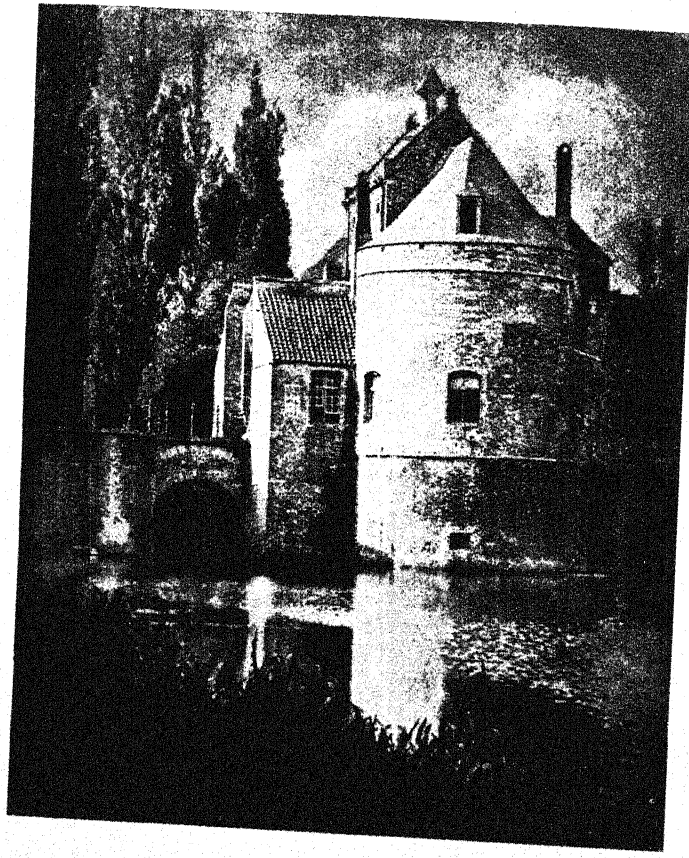
CORONET FILM CAMERAS.

(Made by the Coronet Camera Co., 48, Great Hampton Street, Birmingham.)

Realising the vast market which exists for snapshot cameras of very low price the Coronet Camera Co. have produced a series of models very suitable for this market and of excellent construction at their prices. While low price has been a chief consideration the

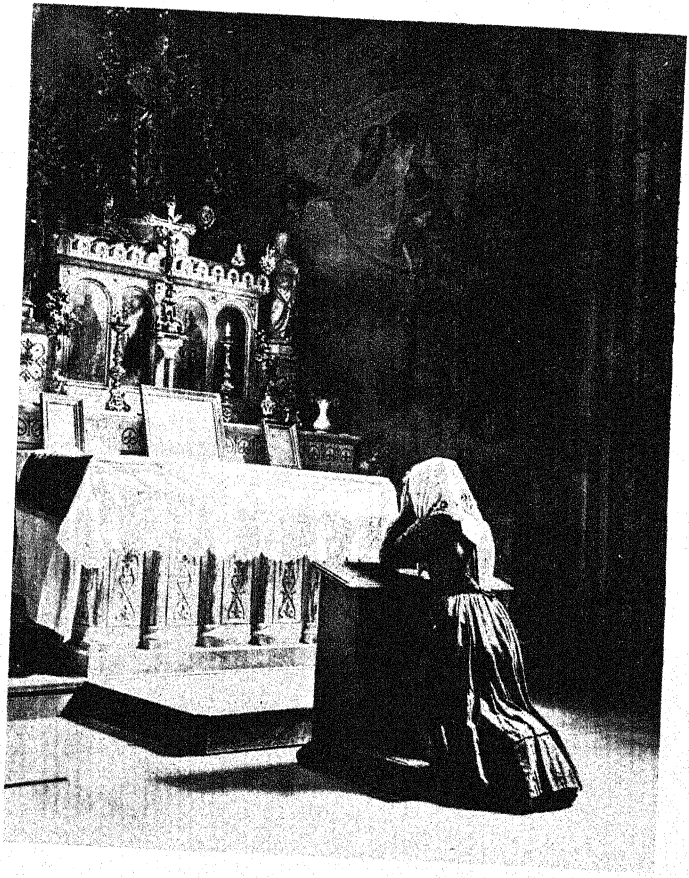


THE FLAMING HEART — JULIAN SMITH



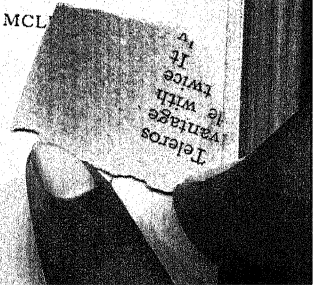
PONT MARECHALE, BRUGES

W. H. WOMERSLEY



THE REFUGE OF THE HUMBLE

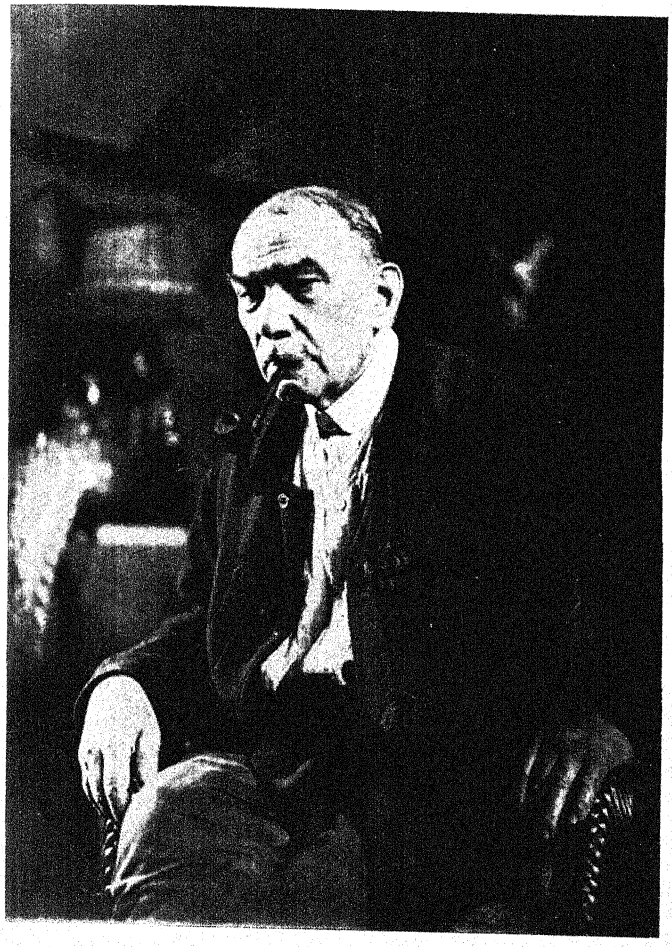
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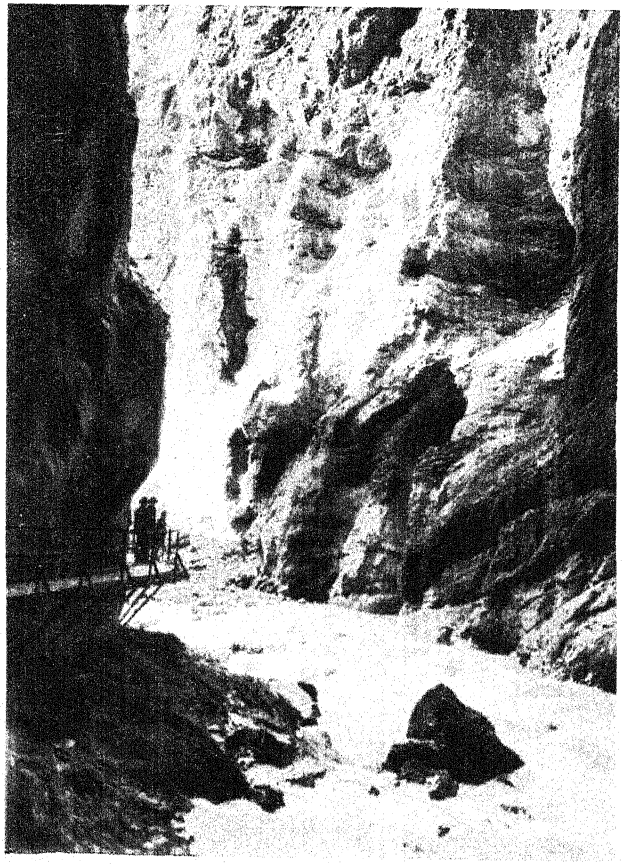
LE SOURIS

WALDEN HAMMOND

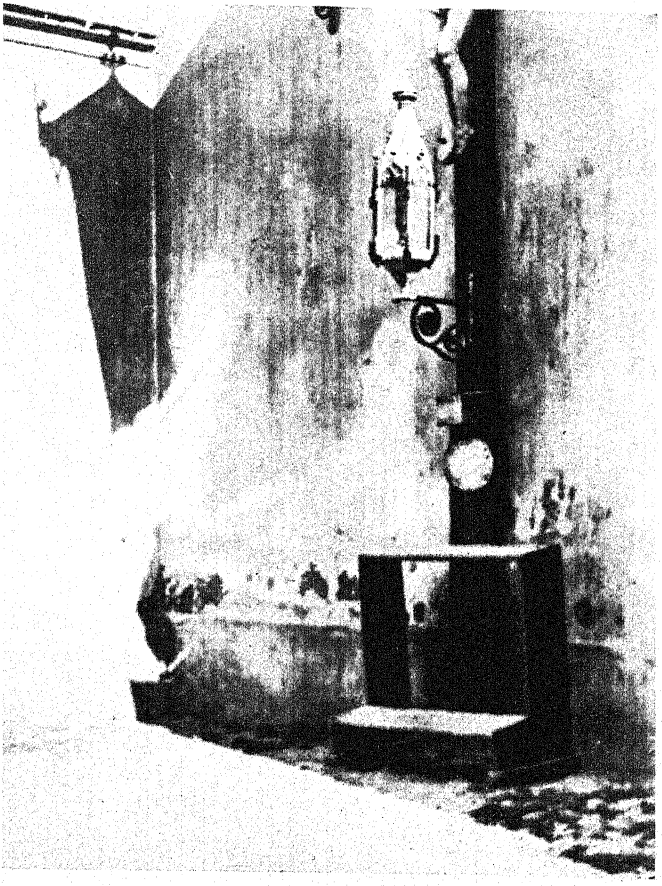


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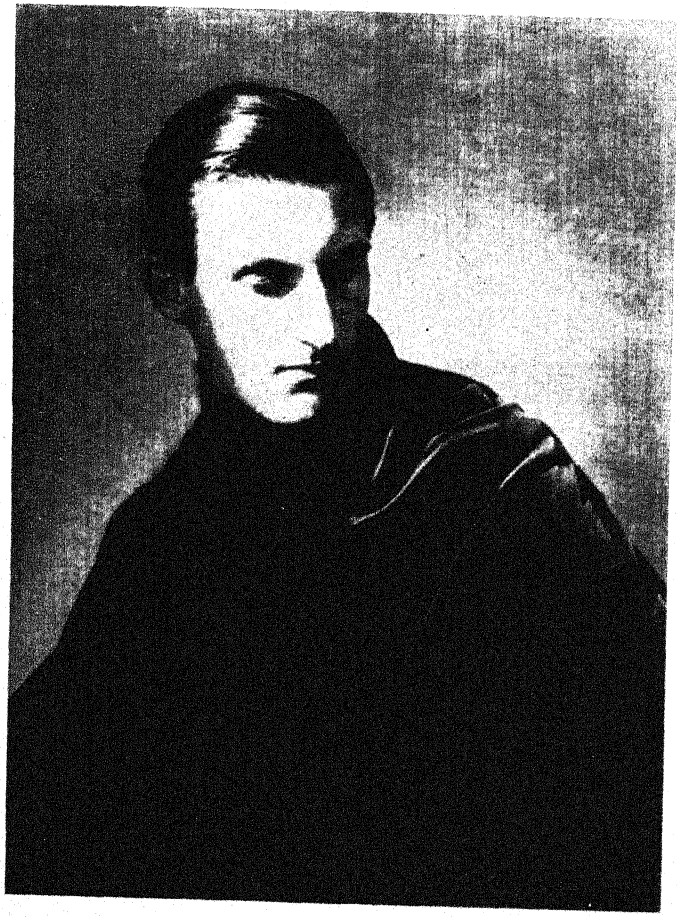


GLEAMS IN THE GORGE, C. H. TOMS



LANTERN

JAROSLAV KRUPKA



CHARACTER

DOUGLAS



ORTHOCHROMATIC PROCESSES

Colour Sensitisers.

Sensitol Red and Sensitol Violet both sensitise strongly for red, orange and bright (yellowish) green. Sensitol Green sensitises strongly for the whole of the blue-green, yellow-green, and yellow, and well into the orange-red.

Plates treated with the red or violet dye may be handled by the light of a safe-lamp transmitting only bluish-green light between λ50 and λ52, but no other light is permissible. Plates treated with Sensitol Green may be handled by a deep ruby light.

A clean-working plate, and in the case of Sensitol Violet a slow plate, such as Ilford Ordinary or Empress, should be selected for treatment in order to obtain sensitised plates free from veil.

Stock Solutions.

In making these it is preferable to dissolve the dye first in part of the solvent (heated), and then to dilute to the requisite strength. The Sensitol Red is made up to 1 : 1000 and the Sensitol Violet up to 1 : 5000 with alcohol or industrial spirit.

Sensitol Green is also made up to a strength of 1 : 1000, but a quarter of the solvent, in which the dye is first dissolved, should preferably be methyl alcohol or wood spirit, the remainder being alcohol or industrial spirit.

All these solutions keep indefinitely in the dark; there is, however, a tendency for Sensitol Red to crystallise out at low temperatures, in which case it should be re-dissolved by careful warming.

Bathing Process.

The actual sensitising baths may be obtained by diluting the stock solutions with water (red and green dyes only) or with spirit.

Aqueous Dye Bath.

Distilled water, 1,000 parts; stock dye solution, 15-20 parts.

Bathe for about 3 minutes, wash well in running water or frequent changes for several minutes, and then dry as quickly as possible in a current of warm dry air free from dust.

Alcohol Dye Bath.

	Red.	*Green.*	*Violet.*
W ...	500	500	500
S ...	250	250	200
D ...	10	15	50

W is distilled water; S, industrial spirit; D, stock dye solution.

Bathe for about 3 minutes, and then dry, without washing, in a current of dry air; this must be cool in the case of the Sensitol violet dye.

All the above operations should be conducted in darkness or in a minimum of deep red light (in the case of Sensitol Green) or of bluish-green light (for Sensitol Red or Sensitol Violet).

The aqueous baths gradually deteriorate on keeping.

The alcoholic baths keep in good condition and may be renewed, after use or after long storage, by the addition of a little stock dye solution.

Safelights.

The following formulæ are for safelight screens made by coating glass with gelatine solution containing a dye. They are suitable for use with electric light, but the screens are liable to fade and become unsafe when used as filters of daylight.

Throughout, the gelatine is one of 6 per cent. strength (60 gms. dissolved in 1,000 c.c.s. water). Each dyed solution is applied in the proportion of 7 c.c.s. per 10 square inches of glass.

Each safelight is made by binding together two coloured gelatine-coated glasses film to film, with or without insertion of white tissue or other paper according as direct or diffused light is desired.

Bright Yellow.

For Lantern Plates or Gaslight Papers.

Gelatine solution ... 500 c.c.s.
(Napthol Orange, 4 gms., dissolved in 100 c.c.s. water.)

Orange.

For Bromide Papers.

I.—Gelatine solution 100 c.c.s.
Tartrazine ... 0·8 gm.
II.—Gelatine solution 100 c.c.s.
Rose Bengal... 0·3 gm.
(I. and II., bound film to film, form the safelight.)

Red.

For Ordinary and Yellow-Green Sensitive Plates.

Gelatine solution ... 500 c.c.s.
Dark-Room Red (Höchst) ... 4·5 gms.
(dissolved in 100 c.c.s. water.)

Green.

For Ordinary and Yellow-Green Sensitive Plates.

Gelatine solution ... 500 c.c.s.
Dark-Room Green (Höchst) ... 4 gms.
(Dissolved in 100 c.c.s. water.)

Dark Red.

Relatively safe for Panchromatic Plates.

Gelatine solution ... 500 c c.s.
Dark-Room Dark Red (Höchst) ... 4·5 gms.
(Dissolved in 100 c.c.s. water.)

Dark Green.

For Panchromatic Plates.

Naphthol green	61 grs. (8 gms.)
Filter blue soln.	1 oz. (32 c.c.s.)
Gelatine (8%) solution	... 16 ozs. (1,000 c.c.s.)

The filter blue solution is prepared by dissolving 0·1 gm. (0·77 grs.) of filter blue in 1,000 c.c.s. (16 ozs.) of water, and adding 1 c.c. (7·7 grs.) of ammonia. Of the mixed solution allow 7 c.c.s. per 100 sq. cm. (750 minims per 100 sq. ins.)

NEGATIVE DEVELOPERS.

Dissolving Chemicals.

For dissolving in hot water a most convenient vessel is a thin beaker-flask (fig. 1) It will stand boiling water, poured into it or brought to a boil by standing flask over gas or spirit flame with a wire gauze in between.



Fig. 1.

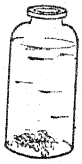


Fig. 2.

To dissolve chemicals with least labour, suspend in muslin or calico bag at top of liquid (fig. 1); solution falls as it is formed, and fresh water constantly comes in contact with the crystals or powder.

If these latter are at the bottom (fig.2) the heavy solution collects round them and requires constantly stirring to remove it.

Make sure that every bit of the developer is dissolved; metol and amidol are the least soluble developers, and undissolved particles will cause black spots on plates.

When making single-solution developers dissolve the alkali (soda carbonate or caustic soda) separately in, say, one-quarter of the water and the other chemicals in three-quarters, to which then add the alkali solution.

A bottle with a flat rim of shape shown in fig. 3 pours badly as a rule; the liquid dribbles down the outside.

Fig. 4, on the other hand, is the kind of bottle neck which pours well.



Fig. 3.



Fig. 4.

In making up the solutions note that those containing the developer do not keep in good condition indefinitely, and that therefore it is well to prepare not more than for, say, three months' use. The alkali, usually the B, solution keeps longer, but should be kept in a corked bottle, not one with a glass stopper, which is liable to stick.

Filtering.

Filtering a solution consists in passing it through a porous paper held for convenience in a glass funnel.

The circular filter is folded once (fig. 5).

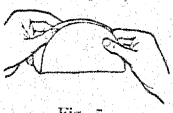


Fig. 5.



Fig. 6.

Then again (fig. 6), taking care not to run crease right down to the point, as this may break paper.

And then opened out into a cone (fig. 7).

The funnel is placed in the neck of a bottle, inserting a strip of card so as to form a vent for the air, or supported on a filter stand (fig. 8).

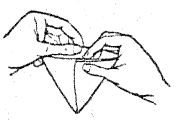


Fig. 7.

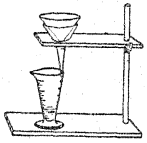


Fig. 8.

For filtering solutions in bulk, use a flannel or calico bag (fig. 9), made by sewing the material into a cone shape.

In making up stock single-solution developer it is a good plan to add alkali solution last, pouring it slowly down a



Fig. 9.



Fig. 10.

"thistle funnel" (fig. 10), to form a layer at the bottom. Then cork tightly and shake up.

Distilled water is not really necessary for making up developers, though it is the best. But it is quite good enough to use ordinary tap or rain water after boiling briskly for five minutes and allowing to stand quietly to cool.

In most cases dissolve the sulphite or metabisulphite before adding the pyro or other developer. Metol is an exception; dissolve it first.

Weights and Measures.

In all formulæ the metric weights are not equivalents of the British item for item, but each formula gives a solution of the same composition.

Desensitising.

Various safranine dyes, notably pheno-safranine, may be employed in the form of a 1 : 2.000 solution for the desensitising of sensitive materials in a preliminary bath before development. Alternatively, this solution may be added to the working developer in the proportion of 1 part to 10 parts of developer.

After an immersion of at least one minute, all plates and films of moderate speed and colour-sensitiveness may be safely developed by screened white light or by a bright yellow safelight. Ultra-fast and panchromatic plates still require care; the behaviour of the latter varies with the mode of sensitising and may necessitate a feeble white light in preference to a red safelight.

With a safranine-treated plate a hydroquinone developer becomes as quick-acting as metol; M.Q. is almost unaffected; pyro-soda and amidol are slightly restrained, the Watkins factor being depressed by one-third.

The pink stain produced by these desensitisers has no effect in printing, even when uneven, but may be removed by treating the negative with a weak solution of nitrous acid:—

Sodium nitrite ...	50 grs. (6 gms.)
Hydrochloric acid	100 mins (12 c.c.s.)
Water	20 ozs. (1,000 c.c.s.)

Immerse for 5 minutes; remove the resulting blue compound by 5 minutes' washing.

PINACRYPTOL-GREEN.

Used as a 1 : 5,000 solution pinacryptol-green acts as efficiently as safranine with ordinary plates and more so with colour-sensitised plates. It also requires at least 1 minute's immersion and may be used in the developer by adding 5-10 drops of stock 1 : 500 solution to each ounce of developing solution.

Like safranine, pinacryptol similarly energises hydroquinone, has little effect with M.Q. or pyro, and markedly restrains the amidol developer.

The extent to which panchromatic plates are desensitised varies according to their mode of sensitising; many forms can, however, safely be developed by bright red or yellow safelight.

Amidol.

While amidol is pre-eminently a developer for bromide paper it can be used for plates, with which it gives somewhat soft negatives. Its chief drawback is that the ready mixed developer does not keep at all well. The average formula is—

Amidol	2–3 grs. (4·5-7 gms.)
Soda sulphite cryst ...	25 grs. (57·5 gms.)
Water	1 oz. (1,000 c.c.s.)

It is best to use the developer on the same day that it is made up, although the solution can be used during the next day or two. Especially for prints, it is best to dissolve the sulphite when making up the developer.

AMIDOL TO KEEP.

A method of making amidol developer which will keep for several weeks in good working condition is as follows: A solution is made of sulphite and metabisulphite, viz.:—

Soda sulphite cryst	4 ozs. (200 gms.)
Potass. meta-bisulphite	¼ oz. (25 gms.)
Water	20 ozs. (1,000 c.c.s.)

It is best to boil this mixture after having dissolved the chemicals in moderately hot water. Boiling is not essential, but it improves the keeping qualities of the solution. The developer is made by taking:

Amidol	40-60 grs. (4·5-7 gms.)
Stock sulphite solution ...	4 ozs. (200 c.c.s.)
Water, ... to make ...	20 ozs. (1,000 c.c.s.)

This developer works rather more slowly than that made according to the ordinary formula.

Azol.

The following are the instructions for the use of this single-solution developer:—

For Plates and Films:—

Normal exposures.

Azol	¼ oz. (5 c.c.s.)
Water	6 ozs (120 c.c.s.)

Under-exposures.

Azol	¼ oz (5 c.c.s.)
Water	8 ozs. (160 c.c.s.)

Over-exposures.

Azol	¼ oz. (5 c.c.s.)
Water	4 ozs. (80 c.c.s.)

For stand development:—Azol, 1 oz.; water, 100 ozs.

For tank development: — Azol, ¾ oz.; water, 40 ozs. Time of development of films at 60 deg. F., 20 to 30 minutes. This solution may be used several times in succession

Ferrous Oxalate.

This developer is rarely used now; it calls for greater exposure of the plate. But it is unique in the perfectly clear grey stainless negatives which it yields.

A.—Potass. oxalate (neutral), 5 ozs.; hot water, 20 ozs. Cool, and pour off clear liquid for use.

B.—Warm water, 20 ozs.; sulphuric acid, 30 minims; sulphate of iron, 5 ozs.

Mix 1 oz. of B with 3 to 4 ozs. of A (pouring B into A, not *vice versa*).

A more powerful developer is made by dissolving commercial dry ferrous oxalate in boiling saturated solution of potassium oxalate. As much as will dissolve is stirred in, and the whole left to cool, after which the clear solution is poured off for use.

Glycin.

ONE-SOLUTION (HÜBL).

Boiling water ...	4 ozs. (1,000 c.c.s.)
Sodium sulphite, cryst	2½ ozs. (625 gms.)
When dissolved, add—	
Glycin	1 oz. (250 gms.)
And then in small quantities—	
Potass. carbonate	5 ozs. (1,250 gms.)

This forms a thick cream, which must be well shaken, and then diluted with water; for normal work, dilute 1 oz. with 12 or 15 ozs. of water; for very soft results, with 30 ozs of water.

Glycin is a slow-acting developer, which keeps for a very long time, and yields negatives perfectly free from stain. It is the best developer for "Stand Development" (which see).

Hydroquinone.

Made up with soda carbonate (as per the first formula below) hydroquinone is a rather slow-acting developer. The caustic-soda formula is quicker, but easily gives excessive density and contrast; it is best suited for line drawings or subjects where full contrast is required.

ONE-SOLUTION.

Hydroquinone ...	100 grs. (11·5 gms.)
Soda sulphite cryst ...	1½ ozs. (75 gms.)
Soda carbonate cryst	3 ozs. (150 gms.)
Water to ...	20 ozs. (1,000 c.c.s.)

May be diluted with an equal volume of water.

This formula is not so quick in action as the next one, but there is less tendency for the great density in the high-lights which is easily produced in cases of under-exposure. In all cases the temperature of the hydroquinone developer should not be allowed to fall below 60 deg. F. (15° C.), otherwise the solution becomes inert.

ONE-SOLUTION (FORMALINE).

Hydroquinone ...	130 grs. (15 gms.)
Soda sulphite cryst ...	6 ozs. (300 gms.)
Formaline ...	3 drs. (20 c.c.s.)
Water to ...	20 ozs. (1,000 c.c.s.)

A slow developer, giving great clearness in the shadows, and plenty of density in high-

lights, and specially suitable for line-subjects.

TWO-SOLUTION (CAUSTIC SODA).

A. Hydroquinone	160 grs. (18 gms.)
Soda sulphite cryst	2 ozs. (100 gms.)
Citric acid ...	60 grs. (7 gms.)
Potass. bromide	40 grs. (4·5 gms.)
Water to ...	20 ozs. (1,000 c.c.s.)
B. Caustic soda (stick)	160 grs. (18 gms.)
Water to ...	20 ozs. (1,000 c.c.s.)

For use :—A, 1 oz. ; B, 1 oz. ; water, 2 ozs.

Metol.

ONE-SOLUTION.

Metol	150 grs. (17 gms.)
Soda sulphite cryst	2½ ozs. (125 gms.)
Soda carbonate cryst	3½ ozs. (175 gms.)
Potass. bromide	16 grs. (1·8 gms.)
Water	20 ozs. (1,000 c.c.s.)

For portraits, take stock solution, 1 oz. ; water, 1 oz. For landscapes, stock solution, 1 oz. ; water, 2 ozs.

TWO-SOLUTION.

A. Metol	150 grs (17 gms.)
Soda sulphite cryst.	2½ ozs. (125 gms.)
Water to ...	20 ozs. (1,000 c.c.s.)
B. Soda carbonate, cryst	3½ ozs. (175 gms.)
Potass. bromide	16 grs. (1·8 gms.)
Water ...	20 ozs. (1,000 c.c.s.)

For portraits, A, 1 oz. ; B, 1 oz. For landscapes, A, 1 oz. ; B, 1 oz. ; water, 1 oz.

Metol gives delicate negatives with great detail and little density unless development is greatly prolonged.

In making up all metol developers, dissolve the metol first, then the sulphite, and then the other chemicals, using warm but not hot water.

Metol-Hydroquinone.

ONE-SOLUTION.

Metol	35 grs. (4 gms.)
Soda sulphite cryst.	2 ozs. (100 gms.)
Hydroquinone ...	50 grs. (5·7 gms.)
Potass. bromide	15 grs. (1·7 gms.
Soda carbonate cryst.	1½ ozs. (75 gms.)
Water to ...	20 ozs. (1,000 c.c.s.)

This is mixed with an equal volume of water at the time of use.

Dissolve the chemicals in metol-hydroquinone developers in the order given in the formulæ.

TWO-SOLUTION.

A. Metol	40 grs. (4·5 gms.)
Soda sulphite cryst.	120 grs. (14 gms.)
Hydroquinone	50 grs. (5·7 gms.)
Potass. bromide	15 grs. (1·7 gm.)
Water to ...	20 ozs. (1,000 c.c.s.)
B. Soda carbonate, cryst.	½ oz. (25 gms.)
Water	20 ozs. (1,000 c.c.s.)

Mix in equal parts

In cold weather it is best to increase the quantity of metol to, say, 60 grs. (6·8 gms.), and reduce the hydroquinone to, say, 30 grs. (3·4 gms.).

Metol Poisoning.

Metol (among other developers) has a poisoning effect on the skin of many people, causing painful sores and irritation.

The following ointment has a very beneficial effect in such cases :—

Ichthyol	...	10 grs.
Lanoline	...	40 grs.
Boric acid	...	40 grs.
Vaseline...	...	30 grs.

Apply two or three times a day, and rub in well before retiring for the night.

Metol Staining.

The stains on the skin and finger-nails produced by metol developers may be prevented as follows :—

The fingers are dipped before starting and fairly frequently while developing in :—

Water	10 ozs.
Hydrochloric acid	10 drops.

The acid stops the action of the developer by neutralising the alkali in the same way that an acid stop-bath does with prints.

If used constantly this bath will also be found to be an effective preventative of metol-poisoning.

Ortol.

A	Ortol	140 grs. (16 gms.)
	Potass. meta-bisulphite	70 grs. (8 gms.)
	Water, cold ...	20 ozs. (1,000 c.c.s.)
B.	Soda carbonate, cryst.	2½ ozs. (125 gms.)
	Soda sulphite cryst.	3½ ozs. (175 gms.)
	Potass. bromide	10 to 20grs. (1·1 to 2·3 gms.)
	Water	20 ozs. (1,000 c.c.s.)

For quick development take 1 part of A and 1 part of B. For slow and soft development take 1 part of A, 1 part of B, and 1 part water.

Paramidophenol.

ONE-SOLUTION.

Potass. metabisulphite	6 ozs. (300 gms.)
Distilled water (boiling)	20 ozs. (1,000 c.c.s.)
Paramidophenol	2 ozs. (100 gms.)

Dissolve quickly in the above order and add gradually—

Caustic soda or potash	q.s.

to dissolve the precipitate first formed.

For use, dilute 1 oz. with from 10-30 ounces of water.

Paramidophenol is stainless and keeps well in single solution, owing probably to its preservative action on soda sulphite.

TWO-SOLUTION.

A.	Paramidophenol hydrochloride	200 grs. (23 gms.)
	Potassium metabisulphite	100 grs. (11·5 gms.)
	Distilled water to	20 ozs (1,000 c.c.s.)
B.	Soda sulphite...	1¼ ozs. (62·5 gms.)
	Potassium carbonate	1¼ ozs. (62·5 gms.)
	Distilled water to	20 ozs. (1,000 c.c.s.)

For use, mix 1 oz. of A with 2 ozs. of B.

Pyro-Soda.

B.J. Non-staining Formula.

Make up two solutions according to the following formula:

A	Pyro	1 oz. (50 gms.)
	Soda sulphite cryst	8 ozs. (400 gms.)
	or anhydrous	4 ozs. (200 gms.)
	Potass. metabisulphite	1 oz. (50 gms.)
	Water	60 ozs. (3,000 c.c.s.)
B	Soda carbonate, cryst.	12 ozs. (600 gms.)
	or anhydrous	4½ ozs. (225 gms.)
	Water	60 ozs. (3,000 c.c.s.)

Mix A, 1 part; B, 1 part;. water, 2 parts.

In making the A solution the sulphite and metabisulphite should be mixed together dry, and put together into hot water. When they are dissolved, the solution should preferably be brought to the boil and boiled for about a minute, after which the pyro is dissolved—when the solution has cooled. The boiling greatly improves the keeping qualities of the solution.

If preferred the sulphite and metabisulphite can be dissolved in only half the water and the necessity of heating or boiling so much solution thus avoided. The second half can be added cold, and the pyro then dissolved.

This developer will produce negatives free from pyro stain, and 4 to 6 minutes development at normal temperature with full exposure will yield soft negatives full of detail and well suited to enlarging. The advantages of the developer are its cleanliness and the extraordinary keeping qualities of the A solution, which must be made up as directed above.

When stronger negatives are required the developer can be made up by taking equal parts of A, of B, and of water, or equal parts of A and B alone can be used, this giving a developer containing about 4 grains pyro to the ounce.

The mixed solution can be used for several plates in succession if a little extra time is given for development in each case.

Time Development.

with B.J. Pyro-Soda.

Table A on page 376 is for use with the B.J. non-staining pyro soda developer made up according to the formula on this page. The working developer is to be made by mixing: A solution, 1 part; B solution, 1 part; water, 2 parts.

Times of development are given in the table as minutes.

The table indicates the times of development for three different degrees of contrast, approximately corresponding with those required for printing on gaslight paper (soft negative), bromide paper or P.O.P. (negative of medium contrast), or self-toning paper (negative of full contrast).

The times of development are indicated for four groups or descriptions of dry plate, viz.:

N—Plates (majority of dry plates on the market) which at 60 deg. F. develop to good contrast fairly quickly. Example, Imperial Special Rapid.

B—Emulsions which at 60 deg. F. take approximately twice as long to develop. Example, Kodak Regular Film.

Development by Time with B. J. Pyro Soda.—Table A.

Table drawn up by J. W. Purkis for development of commercial plates at different temperatures to different degrees of contrast.

	Temp. 50° F.			Temp. 60° F.			Temp. 70° F.		
	Contrast.			Contrast.			Contrast.		
Plate Group.	Soft.	Medium.	Full.	Soft.	Medium.	Full.	Soft.	Medium.	Full.
N ...	11½	16	21	4¼	6¼	8¼	2	3½	5¼
B ...	15¼	24	36	10	14½	20	8	12	17
A ...	7½	11¼	15½	5½	8	11	4½	7	10½
C ...	8	10½	13	5½	7½	9¾	3¼	5	7¼

A—Plates which at 60 deg. F. take somewhat longer in development than group N. Example, Wellington Anti-Screen.

C—Plates which at 60 deg. F. temperature obtain contrast in very nearly the same time as those of group N, but considerably less at 50 deg. F. and considerably more at 70 deg. F. Very few plates, and those, mostly panchromatic, are in this group.

Watkins Thermo Development.

With B.J. Pyro-Soda.

The following tables, worked out by W. A. Heydecker, adapt the B.J. pyro-soda developer for time development by dish or tank, in conjunction with the developing speeds of plates published by the Watkins Meter Co. The letters "VVQ," etc., refer to the development speeds of each class.

The tables indicate the amount of the pyro and alkali stock solutions required to prepare 1000 c.c.s. or 20 ozs. respectively of developing solution. Each figure indicates the amount of *each* stock solution to be mixed and diluted to the specified total volume.

The time of development then necessary is given directly by the Watkins thermometer.

For Dish Development.

	per 1000 c.c.s.	per 20 ozs.
VVQ	82 c.c.s.	1 oz. 5 drs.
VQ ...	110 ,,	2 ozs. 1½ drs.
Q ...	146 ,,	2 ozs. 7½ drs.
MQ ...	188 ,,	3 ozs. 6 drs.
M ...	250 ,,	5 ozs. —
MS ...	330 ,,	6 ozs. 4¾ drs.
S ...	420 ,,	8 ozs. 3 drs.
VS ...	500 ,,	10 ozs. —

Thus, for Q plates, take 146 c.c.s. of A solution, add 146 c.c.s. of B solution and add water to make a total bulk of 1000 c.c.s.

For Tank Development.

	per 1000 c.c.s.		per 20 ozs.
VVQ	24 c.c.s.	—	3¾ drs.
VQ ...	32 ,,	—	5⅛ drs.
Q ...	44 ,,	—	7 drs.
MQ ...	56 ,,		1 oz. 1 dr.
M ...	75 ,,		1 oz. 4 drs.
MS ...	100 ,,		2 ozs. —
S ...	130 ,,		2 ozs. 4¾ drs.
VS ...	168 ,,		3 ozs. 3 drs.

Thus for M plates, mix 1 oz.

4 drams of A solution and 1 oz. 4 drams of B solution and dilute with water to 20 ozs.

Ordinary Formula.

The following is a formula for the pyro-soda developer on the lines recommended by most of the British plate makers, *i.e.*, with metabisulphite only as the preservative of the pyro in the A solution; with sulphite in the B solution in amount generally equal to that of the soda carbonate therein:—

A.	Potass. metabisulphite	30 grs. (3·5 gms.)
	Water... ...	20 ozs. (1,000 c.c.s.)
	Pyro	¼ oz. (12·5 gms.)
B.	Soda carbonate, cryst.	2 ozs. (100 gms.)
	Soda sulphite, cryst.	2 ozs. (100 gms.)
	Potass. bromide	10 grs. (1 gm.)
	Water... ...	20 ozs. (1,000 c.c.s.)

Mix equal parts of A and B.

Pyro-Caustic Soda.

(VALENTA.)

A.	Pyro	220 grs. (25 gms.)
	Soda sulphite, cryst.	3¼ ozs. (162·5 gms.)
	Water to ...	20 ozs. (1,000 c.c.s.)
B.	Caustic potash or	100 grs. (11·5 gms.)
	Caustic soda	70 grs. (8·5 gms.)
	Water... ...	20 ozs. (1,000 c.c.s.)

Take A, 1 oz.; B, 1 oz.; water, 1 oz.

The above is a quick-acting and cheap developer, resembling metol in its characteristics.

Pyro-Ammonia.

(10% SOLUTIONS.)

A.	Pyro	1 oz. (100 gms.)
	Potass. metabisulphite	1 oz. (100 gms.)
	Water to make	9 ozs. (1,000 c.c.s.)

Instead of the metabisulphite 4 ozs. (400 gms.) soda sulphite cryst. may be used.

B.	Potass. bromide ...	1 oz. (100 gms.)
	Distilled water to ...	9 ozs. (1,000 c.c.s.)
C.	Liquid ammonia (0·880)	1 oz. (fl.) (100 c.c.s.)
	Distilled water to ...	9 ozs. (1,000 c.c.s.)

To make a normal developer, take A, 20 minims; B, 10 minims C, 30 minims; water to 1 oz.; or if no bromide is used, A, 20 minims; C, 10 minims; to water, 1 oz.; or in metric measures, A, 2 c.c.s.; B, 1 c.c.; C, 3 c.c.s.; water to 50 c.c.s.

Pyro-Metol.

A.	Pyro	80 grs. (9·2 gms.)
	Metol	70 grs. (8 gms.)
	Potass. metabisulphite ...	180 grs. (20 gms.)
	Potass. bromide ...	30 grs. (3·5 gms.)
	Water to ...	20 ozs. (1,000 c.c.s.)
B.	Soda carbonate cryst.	3 ozs. (150 gms.)
	Water to ...	20 ozs. (1,000 c.c.s.)

For normal exposures, use equal parts. For under-exposures, increase the proportion of B and add water.

Pyro-metol is a developer which gives both detail and density quickly. The negatives are of slightly greenish-black colour, of good printing quality.

Pyrocatechin.

TWO-SOLUTION.

A.	Pyrocatechin ...	175 grs. (20 gms.)
	Soda sulphite, cryst.	1½ ozs. (75 gms.)
	Water ...	20 ozs. (1,000 c.c.s.)
B.	Potass. carbonate ...	2½ ozs. (125 gms.)
	Water ...	20 ozs. (1,000 c.c.s.)

Equal parts are mixed together.

This forms a slow-acting developer, very sensitive to bromide, and suitable for over-exposures.

ONE-SOLUTION.

Soda sulphite, cryst.	5 ozs. (250 gms.)
Water	20 ozs (1,000 c.c.s.)
Caustic soda ...	260-300 grs. (30 to 34·5 gms.)
Pyrocatechin ...	400 grs. (46 gms.)

The chemicals are dissolved in this order, and the stock solution kept well corked. It is diluted with 20 times its volume of water for use. An extremely energetic developer, suitable for under-exposures. Very clean-working and tending to soft contrasts.

M.-Q. for Under-Exposures.

This "maximum-energy" developer is recommended by the Eastman Laboratory as the best known for under-exposed negatives.

Soda sulphite ...	2 ozs. (60 gms.)
Elon (E.K. Metol) ...	250 grs. (16 gms.)
Hydroquinone ...	250 grs. (16 gms.)
Caustic soda ...	150 grs. (10 gms.)
Potass. bromide	150 grs. (10 gms.)
Water to make...	32 ozs. (1,000 c.c.s.)
Wood or denatured alcohol	1½ ozs. (45 c.c.s.)

If excessive contrast results reduce the negative with per sulphate.

Fine-Grain Developer.

Metol	18 grs. (2 gms.)
Soda-sulphite, dry	2 ozs. (100 gms.)
Hydroquinone ...	45 grs. (5 gms.)
Borax	18 grs. (2 gms.)
Water	20 ozs. (1,000 c.c.s.)

Maximum-Contrast Hydroquinone.

A.	Soda bisulphite ...	375 grs. (25 gms.)
	Hydroquinone	375 grs. (25 gms.)
	Potass. bromide ...	375 grs. (25 gms.)
	Water to make	32 ozs. (1,000 c.c.s.)
B.	Caustic soda ...	1½ ozs. (45 gms.)
	Water to ...	32 ozs. (1,000 c.c.s.)

For use, mix A and B in equal parts.

For Contrasty Subjects.

A.	Pyrocatechin ...	¼ oz. (2 gms.)
	Water	12½ fl.ozs. (100 c.c.s.)
B.	Potass. carbonate cryst. ...	2½ ozs. (20 gms.)
	Water	12½ fl. ozs. (100 c.c.s.)

For use, take 1 part of A, 1 part of B and 3 parts of water; the mixed solution to be used only once, immediately it is prepared. Produces a brown tone which may be effectively employed for bromide or gaslight prints.

Film Quantity Developer.

The following metol-hydroquinone-pyro formula is that adopted by the Kodak Company for the tank development in quantity of roll-films and film-packs.

Metol	157 grs. (11·2 gms.)
Hydroquinone	1 oz.-30 grs. (33·3 gms.)
Soda sulphite, cryst.	23¾ ozs.-50 grs. (745 gms.)
Soda carbonate cryst.	20½ ozs.-75 grs. (645 gms.)
Pyro	157 grs. (11·2 gms.)
Water ...	10 gals. (Imperial) (50,000 c.c.s.)

If the water is measured in United States gallons, 12½ gallons must be used (instead of 10 gallons) for the chemicals, as stated in ounces and grains.

Each chemical is to be dissolved separately in a suitable quantity of water, which, except for the pyro, should be warm—about 100° F. (40° C.). Then mix the solutions in the order given in the formula, stirring well and adding cold water to the total volume.

The developer is for use at 65° F. (18° C.), at which temperature development is complete in 20 minutes.

The developer should be kept to full strength by adding stock solution made by dissolving the given quantities of the chemicals in 132 ozs. of water (4,000 c.c.s.). This strengthening solution is added from time to time in the proportion of 3 to 4 ozs. With this occasional strengthening (after each batch of film has been developed) the volume of bath given in the formula should develop 250 spools.

Capacity of Tanks.

One cubic inch equals about 278 minims (16·4 c.c.s.) equal to ·58 oz. or ·0036 gallon (Imperial). Therefore the capacity of a tank can be ascertained by measuring the width, breadth and depth in inches, multiplying the three figures together. This gives the capacity in cubic inches. To find the capacity in ozs., multiply by 4 and divide by 7. To find the capacity in gallons, multiply by ·0036 or divide by 280.

Stand Development.

Glycin is a very suitable developer for this purpose, and the following directions are given for the use of the Hübl formula (given on another page) for a concentrated solution.

N o r m a l developer:—Stock sol., 1 oz.; water, 80 to 90 oz.; potass. bromide, 10 per cent. sol., 80 minims.

In this solution a properly exposed plate should make its appearance in 15 or 20 minutes, and obtain full density in several hours.

For under-exposures:—Stock sol., 1 oz.; caustic soda sol. (10 per cent.), 1 oz.; water, 50 oz., warmed to 75 deg. F.

For over-exposures:—Stock sol., 1 oz.; potass. bromide (10 per cent. sol.), 1 oz.; water, 25 oz.

Restrainers.

Potassium bromide in 10 per cent. solution is the most common restrainer. The dose is from one-half grain (5 minims) per ounce of developer.

Ammonium citrate solution has the advantage that after it has been added to the developer density can be obtained without further fogging, though the development of detail is prevented. An average dose with the pyro-ammonia developer is 6 to 10 grains per ounce (60 to 100 minims of solution made by adding ammonia, about 250 minims, to 1 ounce of citric acid dissolved in a little water until neutral, and diluting the whole to 10 ounces).

Potassium borotartrate.—10 to 30 minims of a 10 per cent. solution restrain with most developers.

Sodium bicarbonate acts as a restrainer, particularly with amidol developer.

Factorial Development.

The total time of development (found by trial to give a certain amount of contrast) divided by the time in which the image first appears is the "factor" of a developer.

The following "Watkins' factors" are abstracted from the instructions for the "Watkins' dark room clock and factorial calculator":—

	Factor.
Amidol (2 grs. per oz.) ...	18
Diogen	12
Hydroquinone (minimum bromide)	5
Hydroquinone (maximum bromide)	4½
Ilford pyro-soda (maximum pyro)	4½
Ilford pyro-soda (minimum pyro)	4½
Imperial pyro-soda ...	5¾
Imperial Standard (pyro-metol)	9
Kodak powders	18
M.Q.	14
Pyrocatechin	10
Quinomet	30

Note.—High-factor developers (*e.g.*, diamidophenol and Azol), owing to the long time which is needed for density, tend to softness. Short-factor developers (*e.g.*, hydroquinone and strong pyro-soda) tend to hardness, as they quickly build up density after the image appears.

Where a factor divides evenly into 60, the product is called a divisor, and will greatly facilitate calculating the total time of development. Thus Diogen has a divisor of 5 (60 divided by 12), and if the time of appearance in *seconds* is divided by 5 the result is the number of *minutes* to develop.

Developer-Fixer.

Ferrotypes.

Hydroquinone ...	¾ oz. (21 gms.)
Soda sulphite, cryst.	2¾ ozs. (78 gms.)
Soda carbonate, cryst. ...	2 ozs. (56 gms.)
Hypo	6 ozs. (170 gms.)
Liq. ammonia ·880	2½ ozs. (70 c.c.s.)
Water to make...	32 ozs. (900 c.c.s.)

The plates develop and fix in one minute and are then simply rinsed in water.

FIXING, WASHING & DRYING.

Hypo Fixing Bath.

The average strength of hypo for fixing negatives is 4 ozs. per 20 ozs. It should not be less, but may be more—5, 6 or 8 ozs.

A convenient method of keeping hypo is : dissolve each pound in about 20 ozs. of water (hot), cool and make up to 32 ozs. in all. Every 2 ozs. of this stock solution equals 1 oz. hypo. It is used as follows to make up baths of various strengths :—

Col. 1.	
8 ozs. ...	Stock, 4 ; water, 1.
6 ozs. ...	Stock, 3 ; water, 2.
5 ozs. ...	Equal parts.
4 ozs. ...	Stock, 2 ; water, 3.
3 ozs. ...	Stock, 3 ; water, 7.
2 ozs. ...	Stock, 1 ; water, 4.

To make fixer containing (per 20 ozs.) any of the quantities of hypo named in Col. 1, mix the stock solution with water in the proportion stated on right, *e.g.*, for a fixer of 4 ozs. hypo, mix 2 parts of stock with 3 parts of water.

In fixing plates or films, three rules should invariably be observed :—

1. Let plates remain in fixer as long again as it takes for the white emulsion to dissolve away.

2. Always rinse fingers under tap or in a dish of water after touching hypo, not simply wipe on a towel.

3. Avoid letting hypo droppings dry up on table or floor. If hypo solution drops or is splashed or spilt, mop it up and leave all clean.

Acid Fixing Baths.

Hypo	4 to 6 ozs. (200 to 300 gms.)
Potass. metabisulphite ...	½ oz. (25 gms.)
Water	20 ozs. (1,000 c.c.s.)

The metabisulphite should be added only when the hypo solution is cool or tepid—not when it is hot.

This is the best formula we know for an acid fixing bath for plates or papers. It keeps clear and stainless to the last, and does not throw down sulphur with use.

Extra Rapid Fixing.

Hypo	4 ozs. (200 gms.)
Ammonium chloride ...	½ to 1 oz. (25 to 50 gms.)
Water	20 ozs. (1,000 c.c.s.)

The ammonium chloride is the commercial sal ammoniac as used for batteries. The bath fixes in about half the usual time but is not recommended for regular use.

Hardening-Fixing.

A. Hypo	5 ozs. (250 gms.)
Water	20 ozs. (1,000 c.c.s.)
B. Soda sulphite, cryst. ...	4 ozs. (200 gms.)
Acetic acid glacial ...	3 ozs. (fl.) (150 c.c.s.)
Alum	2 ozs. (100 gms.)
Water (warm)...	20 ozs. (1,000 c.c.s.)

To make the fixing-hardening

bath, 2 ozs. of the B (hardener-solution) are added to 20 ozs. of the A (hypo) solution.

Hypo	4 ozs. (200 gms.)
Potass. metabi-sulphite ...	60 grs. (6·5 gms.)
Water	10 ozs. (500 c.c.s.)

To this add :—

Chrome alum ...	240 grs. (25 gms.)
Water	10 ozs. (500 c.c.s.)

Hypo	1 lb. 6 ozs. (275 gms.)
Sodium acetate	2 ozs.45 grs. (26·5 gms.)
Chrome alum ...	280 grains (8 gms.)
Water	80 ozs. (1,000 c.c.s.)

Dissolve hypo in 65 ozs. or 70 ozs. of water, and add the sodium acetate. When this is in solution, add the chrome alum previously dissolved in the balance of the water. Excellent for use in hot weather, and will keep a long time without depositing sulphur.

In compounding all hardening-fixing baths, alum should be dissolved by itself in water ; the sulphite likewise, and any acid added to the sulphite, the alum solution being then added to the acid-sulphite solution, and the whole mixture thus formed finally added to the hypo.

For Extra Hardening.

For use at temperatures up to 95° F. (35° C.), the following fixing bath may be used. It is well to make it up fresh each week.

Hypo	5 ozs. (250 gms.)
Soda sulphite, dry	1 oz. (50 gms.)
Formaline ...	2½ ozs.(fl.) (125 c.c.s.)
Water	20 ozs. (1,000 c.c.s.)

Dissolve the hypo first, then the sulphite, and then add the formaline.

Hypo-Eliminator.

Wash the negative for one minute under the tap, and transfer to a shallow dish containing water with enough potass. permanganate in it to turn it pink.

Remove the negative as soon as the colour goes (which will be in a second or two if hypo is present), and keep on treating in the very weak permanganate baths until the colour is not discharged.

The water itself will destroy the permanganate colour, but not quickly as hypo does.

A very cheap and satisfactory process which allows of a negative being ready for drying within three minutes of fixation.

Rapid Drying.

Method I.—Rinse from the hypo-bath, place in 1 : 50 formaline for ten minutes, wash by pouring nearly boiling water six times over the negative and dry by heat. To get rid of the relief which is produced by this process the negative is rubbed with a piece of wash-leather moistened with alcohol.

Method II.—Soak in two successive baths of methylated spirit, and place in a current of air. Ordinary commercial spirit, owing to the mineral naphtha in it, causes a whitish scum on the surface of the film, and is not favourable to clean work.

HARDENING AND CLEARING.

Hardening Baths.

1. Formaline	...	1 oz. fluid. (50 c.c.s.)
Water	...	10 to 20 ozs. (500-1,000 c.c.s.)
2. Alum	...	1 oz. (50 gms.)
Water	...	20 ozs. (1,000 c.c.s.)
3. Chrome alum		1 oz. (50 gms.)
Water	...	20 ozs. (1,000 c.c.s.)

Whichever bath is used, allow it to act for 15 or 20 minutes.

In making up the chrome alum bath, use cold or warm, not hot water.

Clearing Solutions.

ACID ALUM.

Alum	... ...	2 ozs. (200 gms.)
Citric acid	...	1 oz. (100 gms.)
Water	... ...	10 ozs. (1,000 c.c.s.)

Wash well after fixing, and immerse the negative in the above. This bath is also useful for removing white scum from negatives developed with ferrous oxalate if rubbed on with cotton wool.

CHROME ALUM.

1. Chrome alum		½ oz. (25 gms.)
Hydrochloric acid		½ oz. (25 c.c.s.)
2. Citric acid	...	1 oz. (50 gms.)
Water	...	20 ozs. (1,000 c.c.s.)

We prefer bath No. 2 for the final treatment of negatives, and for obtaining a clean smooth film.

Stain Removers.

ALUM-IRON.

The following solution acts on the yellowish stain in a pyro-developed negative, and yields a negative of much quicker printing quality. The solution is slow in action, requiring about 20 minutes.

Alum	... ...	1 oz. (50 gms.)
Ferrous sulphate		3 ozs. (150 gms.)
Citric acid	...	1 oz. (50 gms.)
Water	... ...	20 ozs. (1,000 c.c.s.)

In place of the citric acid half a dram of strong sulphuric acid can be used.

THIOCARBAMIDE.

Thiocarbamide		90 grs. (10 gms.)
Citric acid	...	90 grs. (10 gms.)
Water	... ...	20 ozs. (1,000 c.c.s.)

SODIUM HYPOCHLORITE.

(*Eau de Javelle.*)

This bath need only be resorted to in cases of severe stain, particularly on old negatives.

Bleaching powder		1 oz. (30 gms.)
Sodium carbonate, cryst.		1½ oz. (45 gms.)

Shake up the bleaching powder with a solution of the carbonate in a little water (6 ozs. or 180 c.c.s.), and filter. Stir up the residue with plain water, and again filter. The filtrate (solution of sodium hypochlorite) forms an active stain remover.

It can be acidified with oxalic acid, and then discharges yellow stain still more vigorously, but with risk to the silver image.

N.B.—In either state (alkaline or acid) the solution has a strong softening action on gelatine. Plates should not be left to soak longer than necessary—which should be 10 to 15 minutes as a rule.

Bleach and Re-Developer.

(Ilford Formula.)

For negatives which are very heavily stained by developer the following method of the Ilford Co. is often the only one which will entirely remove the stain. The negative is treated in a solution which simultaneously removes the stain and bleaches the silver image. This solution is :—

Potassium permanganate	50 grs. (5·7 gms.)
Common salt ...	¼ oz. (12·5 gms.)
Acetic acid (glacial)	1 oz. (50 gms.)
Water	20 ozs. (1,000 c.c.s.)

If the negative is one freshly made, it is as well to pass it through a weak bath of chrome alum (about 50 grains in 10 ounces of water, *i.e.*, 10 gms. per litre) before applying the bleacher.

The bleacher is allowed to act for ten minutes, rocking all the time. It cannot harm the gradations of the negative, and this full time makes sure of the removal of the stain, and avoids a repetition of the process. After a brief rinse, the negative is left in a solution of potass metabisulphite (1 ounce in 20 ounces of water) until white everywhere to the back of the film, and is then re-developed in any non-staining developer.

Silver Stains.

Most silver stains (due to dampness of paper or negative while the two are in contact) will readily yield to the following simple treatment first suggested by Mr. Harold Baker :—

Rub the dry negative with Globe metal polish (or other similar abrading preparation) for a minute or two. This is done by applying the polishing paste on a tuft of cotton wool. Then place negative in very strong hypo solution. Here the stain disappears ; the time may be minutes or hours according to the depth and age of the stain.

In very severe cases the following method may be necessary :—

Soak the negative in :—

A. Potass. iodide	200 grs. (45 gms.)
Water ...	10 ozs. (1,000 c.c.s.)

and after washing transfer to—

B. Potass. cyanide	300 grs. (70 gms.)
Water ...	10 ozs. (1,000 c.c.s.)

in which rub the stained part of the film with a pledget of cotton wool.

If the stain does not yield to this treatment a solution of iodine (in potass. iodide) may be used in place of solution A, but it must be handled with very great care, since the iodine acts more powerfully and it is not at all an easy matter to remove the silver stain without affecting the silver image.

NEGATIVE INTENSIFIERS.

Which to Use.

Negatives which are too thin (and as a rule yield flat prints) may be greatly improved by intensification.

If the negative is thin through under-exposure, that is, has not attained good density even on long development, the best intensifier is the uranium. For this, as for most intensifiers, the plate should be both thoroughly fixed and washed—one is as important as the other.

If the plate is simply under-developed—clear and bright, but thin—the chromium or the mercury and ferrous oxalate intensifier (applied more than once if necessary) or the Wellington silver intensifier is very suitable.

If the plate is over-exposed, thin but veiled and flat, the mercury and ammonia intensifier is a good remedy ; or it may be well first to reduce carefully with Farmer's reducer, and then (after a second thorough wash) to intensify with chromium, mercury and ferrous oxalate, Wellington's, or, if plate is very flat, with Monckhoven's or the mercury and ammonia formula.

The copper and lead intensifiers give great density, and are suited only for negatives of line drawings, etc., in which great general opacity and, at the same time, great clearness of the lines are required.

They are not suitable for ordinary negatives, *e.g.*, landscape or portrait.

Mercury Intensifiers.

The negative is bleached in the following saturated solution of mercury bichloride :—

Mercury bichloride	...	1 oz. (62 grms.)
Hot water	...	16 ozs. (1,000 c.c.s.)

After cooling this solution and pouring off from the white feathery crystals thrown down, add—

Hydrochloric acid		30 minims (4 c.c.s.)

After *well washing*, the bleached negative is blackened in one or other of the following :—

A. Ammonia (0·880)	...	20 drops. (20 drops)
Water	...	1 oz. (30 c.c.s.)

Gives great intensification and good black colour.

B. Soda sulphite, 10 per cent. solution, made slightly acid with citric acid. Very slightly strengthens a negative.

C. An alkaline developer, such as pyro-soda, pyro-ammonia, hydroquinone. Gives about double the intensification of B.

D. Schlippe's salt	...	200-400 grs. (20-40 gms.)
Water	...	20 ozs. (1,000 c.c.s.

This solution must be made fresh, and gives great intensification.

E. Ferrous oxalate developer, made as directed under "Developers." This process can be repeated as many times as desired, and gives absolutely permanent results ; it deals evenly throughout with the tones in the negative.

Mercuric Iodide.

The Lumière formula of this intensifier is the best of all intensifiers for moderate increase of density and contrast owing to the readiness with which the action can be stopped at any required stage.

A. Mercuric chloride	175 grs. (40 gms.)
Water	10 ozs. (1,000 c.c.s.)
B. Potass. iodide...	1 oz. (100 gms.)
Water	10 ozs. (1,000 c.c.s.)

Add the major part of the iodide (B) solution to that of the mercury and stir well. There should remain a considerable red precipitate. Then add the remainder of the iodide solution in small doses until the solution just clears. This forms the stock intensifier.

The solution changes the negative to a brown colour, which on washing in water changes to bright orange, yielding a very great degree of intensification. For still greater intensification and black colour, pass the negative, after washing, through a bath of soda sulphide, a few grains to the ounce.

A cheaper form of this formula can be made up by using only 270 grs. of potass. iodide instead of 1 oz. as directed above. This is added to the mercury solution, forming a muddy red mixture which can be cleared by adding a few drops of hypo solution.

Lumière Formula.

Water	20 ozs. (1,000 c.c.s.)
Sodium sulphite cryst.	4 ozs. (200 gms.)
Mercuric iodide	90 grs. (10 gms.)

The sulphite must be dissolved first. The solution keeps well in the dark.

This is a very convenient intensifier, as plates need only be rinsed for a few minutes in water on coming out of the hypo bath to be ready for intensification.

When intensified they are simply washed for a few minutes; the negative is then liable to yellow in time, but if plate is placed for a few minutes in any non-staining developer the results are quite permanent.

If mercuric iodide is not available the following may be used :—

Mercuric chloride	50 grs. (6 gms.)
Water	10 ozs. (500 c.c.s.)

Add 10 per cent. potass. iodide solution until precipitate first formed is redissolved. About 1½ oz. (75 c.c.s.) will be required and when clear add—

Sodium sulphite	4 ozs. (200 gms.)
Water to make...	20 ozs. (1,000 c.c.s.)

Monckhoven's.

Gives very great intensification and contrast, especially useful for negatives of line subjects.

A. Bromide of potassium ...	10 grs. (23 gms.)
Bichloride of mercury ...	10 grs. (23 gms.)
Water	1 oz. (1,000 c.c.s.)
B. Pure cyanide of potass. ...	10 grs. (23 gms.)
Nitrate of silver	10 grs. (23 gms.)
Water	1 oz. (1,000 c.c.s.)

The silver and cyanide are dissolved in separate lots of water, and the former added to

the latter until a permanent precipitate is produced. The mixture is allowed to stand 15 minutes, and, after filtering, forms Solution B.

Place the negative in A till it is white, then rinse and transfer it to Solution B. If the intensification has been carried too far, it may be reduced by treatment with a weak solution of hyposulphite of soda.

Chromium Intensifier.

An excellent and convenient intensifier for general work. Results, permanent.

The bleaching bath is best made up from the two following stock solutions :—

A. Potass. bichromate	...	1 oz. (50 gms.)
Water ...	...	20 ozs. (1,000 c.c.s.)
B. Hydrochloric acid		1 oz. (fl.) (100 c.c.s.)
Water to	...	10 ozs. (1,000 c.c.s.)

The hydrochloric acid is that sold as "commercial pure" of sp. gr. 1·160.

Bleaching Baths.

	No. 1.	No. 2.	No. 3.
A ...	4 ozs.	8 ozs.	8 ozs.
B ...	3 drms.	2 ozs.	8 ozs.
Water	16 ozs.	10 ozs.	4 ozs.

Bleach in No. 1, 2 or 3 mixture, wash until yellow stain is removed and then develop with diamidophenol.

If other developer is used, it may be necessary to expose for a short time to diffused daylight (not sunlight) during development in order to get full density. Excessive exposure before development may make it difficult to obtain density.

No. 1 gives intensification about equal to mercury and ammonia; No. 2, to that of mercury and ferrous oxalate; and No. 3, to that of mercury and sodium sulphite.

The process may be safely applied after fixation if the plate is simply rinsed for a minute or so.

It may be repeated several times if the first application does not give enough density.

The No. 3 formula for the chromium intensifier, namely, that giving the least intensification, is a very useful means of improving bromide prints which are a trifle weak and particularly which are of poor colour. The re-developed black image is usually a finer black than can be obtained by direct development.

Silver Intensifiers.

ACID SILVER.

A. Pyro ...	...	15 grs. (3·5 gms.)
Citric acid	...	5-10 grs. (1-2 gms.)
Water ...	...	10 ozs. (1,000 c.c.s.)
B. Silver nitrate	...	10 grs. (23 gms.)
Water to	...	1 oz. (1,000 c.c.s.)

About 1 oz. (30 c.c.s.) of A is poured over the plate once or twice, about 15 drops of B solution added, and the mixture again applied. Intensification now takes place and the solution is poured off and on until sufficient. If intensifier becomes very thick and turbid, fresh should be mixed up. When dense enough the negative is rinsed, fixed and washed. Negatives (on gelatine plates)

are best hardened with alum or formaline before using this intensifier, otherwise it is difficult to avoid stains.

WELLINGTON'S FORMULA.

First harden the film in :— Formaline, 1 part; water, 10 parts, for five minutes. Rinse for a few minutes, and then place for *exactly one minute* in :—

Potass.ferricyanide	20 grs. (2·3 gms.)
Potass. bromide	20 grs. (2·3 gms.)
Water	20 ozs. (1,000 c.c.s.)

This causes no apparent change in the negative; if used too long it will bleach the negative and alter its gradation. Rinse again for a few minutes and intensify.

Stock Solutions.

A. Silver nitrate ...	800 grs. (91·2 gms.)
Water (distilled) to	20 ozs. (1,000 c.c.s.)
B. Amm. sulphocyanide	1,400 grs. (160 gms.)
Hypo	1,400 grs. (160 gms.)
Water to ...	20 ozs. (1,000 c.c.s.)

Take A, ½ oz., and add slowly to ½ oz. B, stirring vigorously (mixture should be clear); then add 10% pyro solution (preserved with sulphite), 1 dram, and 10% ammonia solution, 2 drams.

Place negative in chemically clean dish, best of glass, and pour solution over it. Silver begins to deposit in a minute or two. When intensified enough, place in acid fixer and well wash. Flat negatives may be over-intensified, and then treated with Farmer's reducer.

Copper Intensifier.

Gives great intensification and is best suited for line subjects.

A. Copper sulphate	100 grs. (230 gms.)
Water	1 oz. (1,000 c.c.s.
B. Potass. bromide	100 grs. (230 gms.)
Water to ...	1 oz. (1,000 c.c.s.)

A and B are separately made up with hot water, mixed, and allowed to cool. The negative is bleached in the mixture, and washed for a minute or two. It is then blackened in :—

Silver nitrate ...	45 grs. (100 gms.)
Water (distilled)	1 oz. (1,000 c.c.s.)

For still greater density the negative is well washed from silver and an ordinary developer applied.

If too dense, after the silver, it can be placed in weak hypo solution (about 10 grs. per oz.) or weak potass. cyanide (about 2 grs. per oz.).

Uranium Intensifier.

A. Uranium nitrate ...	100 grs. (23 gms.)
Water	10 ozs. (1,000 c.c.s.)
B. Potass. ferricyanide	100 grs. (23 gms.)
Water	10 ozs. (1,000 c.c.s.)

The intensifier is prepared from :—A sol., 1 oz.; B sol., 1 oz.; acetic acid, 2 drachms.

The plate must be perfectly free from hypo, and after intensification be washed in several changes of *still* water until the yellow stain is gone. A 10 gr. per oz. solution of ammonium sulphocyanide re-

moves any yellow stain, and weak ammonia or sodium carbonate removes the intensification altogether, restoring the negative to its original state. A weak acetic acid bath should then be applied to the negative if the intensifier is to be again applied.

Lead Intensifier.

The lead intensifier gives very great intensification, and is suited only for line subjects.

Lead nitrate	...	400 grs. (46 gms.)
Potass. ferr-cyanide	...	600 grs. (70 gms.)
Acetic acid	...	3 drachms (20 c.c.s.)
Water to	...	20 ozs. (1,000 c.c.s.)

This stock solution will keep for a long time in the dark. The negative is bleached in it, washed once *very carefully* in 10 per cent. nitric acid—the acid makes the film very tender—then in water, and then darkened in :—

A. Sodium sulphite ...	...	1 oz. (50 gms.)
Water ...	...	20 ozs. (1,000 c.c.s.)
or in—		
B. Schlippe's salt ...	...	90 grs. (10 gms.)
Ammonia (0·880)	...	6 drachms (40 c.c.s.)
Water...	...	20 ozs. (1,000 c.c.s.)
or in—		
C. Potass. bichromate		1 oz. (100 gms.)
Ammonia (0·880)	...	½ oz. (50 c.c.s.)
Water ...	...	10 ozs. (1,000 c.c.s.)

Any of the above darkening solutions gives great intensification.

Callier Formula.

This formula is specially suitable for gelatine plates.

Potassium ferricyanide		360 grs. (40 gms.)
Lead nitrate	...	520 grs. (60 gms.)
Acetic acid, glacial	...	3 drms. (20 c.c.s.)
Water ...	...	20 ozs. (1,000 c.c.s.)

The negative is bleached in the above and then passed through three or four baths of :—Hydrochloric acid, 1½ ozs. ; water, 50 ozs., remaining in each for about 5 minutes. Then wash until washings are white and darken in weak solution of ammonium sulphide.

For Weak Negatives.

An intensifier suitable for dealing with ghosts of images is the following, due to M. G. Zelger of the Pathé-Cinema Laboratories. The negative is bleached in a mixture of 2 parts of A and 1 part of B.

A. Copper sulphate ...	...	90 grs. (5 gms.)
Acetic acid, glacial	1 oz.	1 dram (28 c.c.s.)
Water ...	...	20 ozs. (500 c.c.s.)
B. Potass. iodide		180 grs. (5 gms.)
Ammonia (22° Baumé)		3½ ozs. (46 c.c.s.)
Water ...	...	20 ozs. (250 c.c.s.)

Negative bleaches to a yellowish colour and is then washed for about 20 minutes in running water. It is then darkened with :—Silver nitrate, 22 grs. ; sodium acetate, 90 grs. ; water, 20 ozs. To avoid stain, it is well to treat the negative with a solution of alum before using the darkening bath.

NEGATIVE REDUCERS.

Reduction is useful if the negative is so dense (black) that it takes long to print. Also, apart from reducing time of printing, reduction is used to improve the gradation of negatives.

For those which are too hard, usually as the result of under-exposure and too long development, the best reducer is the persulphate. The permanganate reducer is similar in its effect.

For those which, though dense, yield prints which are too flat—this is the result of great over-exposure and long development—the best is Farmer's. Belitski's is similar.

Even when density is not excessive, it is usually well, in the case of flat negatives, to reduce a little in "Farmer's," and then intensify.

The other reducers—Eder's and iodine-cyanide—are used chiefly when it is desired to carry out a little reduction of negatives of good gradation.

Farmer's.

This reducer tends to remove detail in the shadows whilst leaving untouched the dense high-lights. Hence it increases contrast, "brightens up" a negative.

Hypo solution (1 : 5) ...	5 ozs. (150 c.c.s.)
Potass. ferricyanide (10% sol.) ...	quant.suff.

The quantity of ferricyanide solution to be added is best judged by the colour of the mixture, which as a rule should be pale yellow, not orange, and should be used weak rather than strong, since its selective action on the shadows of a negative is then less.

Yellow stain is due usually to the use of an acid fixing bath, or an old fixing bath, instead of clean plain hypo solution. It is not easy to remove.

If the reduction is required as "even" as possible, that is, less pronounced on the shadows of the subject in the negative, use the reducer very weak, viz., largely diluted with water.

Where the extreme of contrast is required, use a strong reducer, applying it with cotton wool, not too wet with reducer. Very useful for line negatives, where quite clear lines on a dense ground are wanted.

Belitski's.

Potass. ferric oxalate	150 grs. (10 gms.)
Sodium sulphite, cryst.	125 grs. (8 gms.)
Water	7 ozs. (200 c.c.s.)

Dissolve and add :—

Oxalic acid	... 40 to 45 grs. (2·5 to 3·1 gms.)

and shake until the solution turns green. Then pour off from undissolved crystals and add :—

Hypo	$1\frac{3}{4}$ oz. (50 gms.)

This reducer is stainless, and keeps well in the dark. Its action on the shadow detail of the negative is similar to that of Farmer's. It varies

somewhat with the strength of the solution.

Instead of the ferric oxalate the following more easily obtainable chemicals can be used in the formula :—

Ferric chloride ... cryst. ...	100 grs. (6·5 gms.)
Potass. oxalate...	190 grs. (12·5 gms.)

Proportionate Reducer.

A mixed reducer of permanganate and persulphate, originally suggested by N. C. Deck, is found to act proportionately on the densities of a negative. The following formula is that worked out by Kenneth Huse and Adolph H. Nietz, of the Eastman Research Laboratory, for this purpose.

A. Potass. permanganate ...	2·2 grs. (0·25 gm.)
Sulphuric acid	130 minims (15 c.c.s.)
Water	20 ozs. (1,000 c.c.s.)

The sulphuric acid is a 10 per cent. solution by volume of the 1·84 strong acid.

B. Ammonium persulphate...	220 grs. (25 gms.)
Water	20 ozs. (1,000 c.c.s.)

These stock solutions keep well separately ; they are mixed together at the time of use in the proportion of 1 volume of A to 3 volumes of B to form the working reducer. The time of reduction is from 1 to 3 minutes.

Greater control of the action can be obtained by diluting the working mixture with its own bulk of water. After reduction the negative should be immersed for 5 minutes in a solution of about 45 grs. potass. metabisulphite in 10 ozs. of water. The negative should then be washed for a short time.

Persulphate.

The persulphate reducer acts first on the heavy high-light densities of the negatives, reducing these without affecting shadow detail. It thus "softens" a hard negative.

Ammonium persulphate ...	10 to 20 grs. (25 to 45 gms.)
Water	1 oz. (1,000 c.c.s.)

A fresh solution is made at time of use. A drop of sulphuric acid per 2 ozs. makes the action more regular. Persulphate has an unenviable reputation for occasional uncertainty in action. A contributor, Mr. A. H. Hall, recommends the following method of using it as infallible. Dry the negative, wet it well, give it a rinse in hypo-eliminator, wash for a few minutes. Make up fresh persulphate solution in water previously acidulated with a drop or two of sulphuric acid, pour on the reducer and rock the whole time. When the milky deposit begins to appear, note the time and continue for 20-30 seconds, for slight reduction, increasing the time for heavier reduction.

If no action is seen in two minutes, throw the solution away, wash the negative, and repeat. If much reduction is required when the solution appears opalescent, throw it away and pour on fresh.

In the case of a panchromatic negative where clouds are too dense, it is safer to determine the time of reduction beforehand, that is from the appearance of the milky deposit and remove the plate after that

time. More uniform results are obtained than by visual inspection. In all cases the action of the bath is stopped by immersing the plate in a solution of soda sulphite.

Iodine-Cyanide.

A very clean-acting (but intensely poisonous) reducer. Very suitable, when used with the further addition of water, for bromide prints, as it leaves no stain.

Iodine (10% sol.)	30 minims. (6 c.c.s.)
Potass. cyanide solution ...	5 minims. (1 c.c.)
Water	1 oz. (100 c.c.s.)

To make the iodine solution mix about 150 grs. potass. iodide with just enough water to dissolve it, add 45 grs. iodine flakes, which will dissolve in an instant on stirring, and add water to make 1 fluid oz.

The cyanide solution is one of 10 per cent. strength.

Permanganate.

Potass. permanganate, sol'n	1 dr. (10 c.c.s.)
Sulphuric acid solution ...	5 drs. (50 c.c.s.)
Water	10 ozs. (1,000 c.c.s.)

The permanganate is a 5 per cent. solution. The sulphuric acid is a 10 per cent. solution by volume of the 1·84 strong acid.

Applied to a wet negative, gives even reduction. A dry negative receives greater reduction in the high lights, and great softening may be obtained by immersing dry negative quickly in the reducer, washing immediately, drying and re-immersing. Any brown stains are removed with a 10% solution of sodium sulphite containing 2% oxalic acid.

Hypochlor. and Alum.

Chrome alum ...	10 grs. (4 gms.)
Eau de Javelle...	½ oz. (100 c.c.s.)
Water to make...	5 ozs. (1,000 c.c.s.)

Immerse the negative and gently rub the surface with a piece of cotton wool. By confining friction with the wool to certain parts, extra reduction can be obtained.

For Eau de Javelle, see under *Clearing Solutions.*

Baskett's (Local) Reducer.

Globe metal polish ...	2d. tin.
Terebene ...	2 ozs.
Salad oil ...	2 ozs.

The ingredients are to be well mixed, and strained through fine muslin two or three times to remove any coarse particles. Dense parts of a negative are rubbed down with the reducer applied by the finger-tip or with a bit of chamois leather.

Reducing Hard Negatives.

A most valuable and perfectly safe method of reducing excessively hard negatives is one dependent on re-development. Bleach the negative first in a solution of ferricyanide and ammonium bromide, using the same bath as is commonly employed for sulphide toning.

After a thorough wash redevelop in a developer containing 2 per cent. of Rodinal and 1 per cent. of potassium bromide—that is, one containing 1 dram of Rodinal and 5 drams of 10 per cent. bromide solution in 6 ozs. of water.

Development will be very slow, but the plate may be left

to itself for half an hour or so, as the action cannot go too far. When development is sufficient the plate is fixed, washed and dried.

The advantage of this process over reduction with persulphate is the great degree of control. The re-development can be stopped at any desired stage after a little experience in judging the degree of re-development.

NEGATIVE VARNISHES.

How to Varnish.

Using Cold Varnish.

First place negatives where they will become perfectly dry,

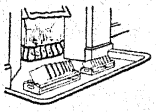


Fig. 1.

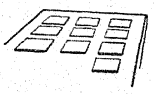


Fig. 2.

e.g., near a fire (fig. 1) or on a bath hot water tank.

Next lay out to get quite cold (fig. 2).

Dust negatives with a strip of cotton plush or camel's hair brush (fig. 3).

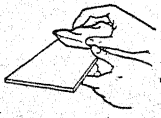


Fig. 3.

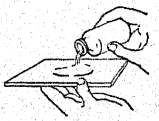


Fig. 4.

Poise negative on tips of fingers, steady with thumb and pour pool of cold varnish on to centre of the negative (fig. 4). Use plenty of varnish.

Let pool spread of itself (fig. 5).

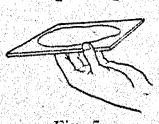


Fig. 5.

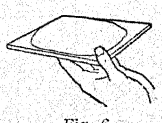


Fig. 6.

Now incline plate so as to cause the varnish to flow into right-hand corner (fig. 6).

Then into the left-hand far corner (fig 7).

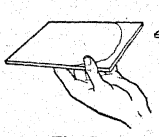


Fig. 7.

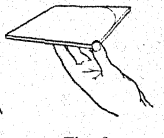


Fig. 8.

Then into the left-hand near corner (fig. 8).

Finally raise the negative so as to let the excess of varnish flow back into the bottle (fig. 9).



Fig. 9.

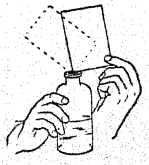


Fig. 10.

In tilting the negative to distribute the varnish, return the plate to the level position *a little before* varnish has reached the corner; the wave of varnish will carry the coating into the corner, and you will avoid getting varnish on the glass side or up your sleeve.

As last drops of varnish run into the bottle, rock negative to and fro (fig. 10), so as to avoid a streaky coating. Then stand the negative on edge on blotting paper to dry.

Cold Varnishes.

Celluloid ...	1 oz. (10 gms.)
Amyl acetate ...	50 ozs. (500 c.c.s.)

To counteract the sickly odour of amyl acetate, add a small proportion of oil of lavender.

This may be flowed over or applied with a brush to the cold negative.

Zanzibar copal	6 ozs. (30 gms.)
Amber (fused) ...	1 oz. (5 gms.)
Ether	60 ozs. (300 c.c.s.)
Acetone ...	40 ozs. (200 c.c.s.)
Chloroform ...	4 ozs. (20 c.c.s.)
20% shellac solution ...	2 ozs. (160 c.c.s.)
Ammonia (0·880) ...	3 drs. (30 c.c.s.)
Methylated spirit	4 ozs. (320 c.c.s.)

A mixture of Japanese gold size (1 part) and benzole (2 parts) forms a rather slow-drying though otherwise excellent cold varnish. The surface takes the pencil well.

Water Varnish.

Shellac	3 ozs. (100 gms.)
Sodium carbonate (saturated sol.)	24 ozs. (800 c.c.s.)

The shellac is allowed to soak in the liquid for twenty-four hours; the liquor is then poured away and replaced by an equal quantity of water, and the mixture boiled until the shellac dissolves. After standing some time the liquid becomes perfectly clear and bright.

Hot Varnishes.

1.

Sandarac ...	1 oz. (55 gms.)
Seed lac ...	1½ oz. (83 gms.)
Castor oil ...	3 drs. (20 c.c.s.)
Oil of lavender...	1½ dr. (10 c.c.s.)
Alcohol ...	18 ozs. (fl.) (1,000 c.c.s.)

This varnish is somewhat dark in colour.

2.

Best orange shellac	2½ ozs. (125 gms.)
Oil of lavender ...	¼ oz. (13 c.c.s.)
Methylated alcohol	20 ozs. (1,000 c.c.s.)

Instead of oil of lavender, oil of turpentine (pure) can be used.

Keep in a warm place until dissolved; then add a large teaspoonful of whiting or prepared chalk; shake, set aside to clear, and then decant. This is specially recommended for gelatine negatives.

3.

White hard varnish	15 ozs. (150 c.c.s.)
Rectified spirit	20 to 30 ozs. (200 to 300 c.c.s.)

Methylated spirit should not be used. This will be found a good varnish if durability is not required, as it is easily rubbed up for retouching upon and easily cleaned off.

4.

Seed lac ...	2 ozs. (50 gms.)
Sandarac ...	2 ozs. (50 gms.)
Oil of lavender ...	½ oz. (12·5 gms.)
Castor oil ...	1 oz. (25 c.c.s.)
Alcohol	40 ozs. (1,000 c.c.s.)

To prepare a good surface for the retouching pencil, the negative after varnishing is dusted

over with fine resin powder and rubbed up with the fingers.

5. Sandarac	...	4 ozs. (113 gms.)
Alcohol ...	...	28 ozs. (800 c.c.s.)
Oil of lavender...		3 ozs. (85 c.c.s.)

This is a good varnish for retouching upon, and a tooth is easily obtained by rubbing.

Film Varnishes.

The above water varnish is suitable, or the following:—

Borax ...	...	300 grs. (30 gms.)
Glycerine	...	300 minims (30 c.c.s.)
Shellac ...	...	600 grs. (70 gms.)
Water ...	...	20 ozs. (1,000 c.c.s.)

Boil together for about half an hour, then add—

Methylated spirit	5 ozs. (250 c.c.s.)

and filter.

Another good varnish for celluloid films is:—

Dammar	...	500 grs. (115 gms.)
Benzole ...	...	10 ozs. (1,000 c.c.s.)

in which, after filtration, the films are immersed and then hung up to dry.

Retouching Medium.

Pale gum resin	200 grs. (230 gms.)
Gum dammar ...	90 grs. (100 gms.)
Gum mastic ...	20 grs. (23 gms.)
Oil of juniper ...	1 gr. (1 gm.)
Oil of turpentine	2-4 ozs. (1,000-2,000 c.c.s.)

The gums are powdered and added to the oils, and finally enough pure asphaltum is added to give the mixture a dark amber colour when viewed through the depth of an inch.

This formula is strongly recommended by Whiting in his "Retouching" as not liable to pick, rub off, or come off on after-varnishing. It takes a great deal of work.

Ground-Glass Varnish.

Sandarac	...	90 grs. (103 gms.)
Mastic ...	...	20 grs. (23 gms.)
Ether (0·720)	...	2 ozs. (1,000 c.c.s.

Dissolve the resins in the ether and afterwards add—

Benzole	...	½ to 1½ ozs (250-750 c.c.s.)

The proportion of the benzole added determines the nature of the matt obtained.

This varnish must be applied to the cold negative or the coating will not be matt.

Tinted Varnish.

Malachite green, aurantia, or asphaltum is used for tinting the above matt varnish green, yellow, or brown respectively (for handwork on the back of a glass negative).

For the occasions, however, when a tinted matt varnish is required only in small quantity, *e.g.*, for equalising the printing density of a negative, as convenient a means as any is to add a little ordinary iodine (flakes) to the varnish made in accordance with the above formula.

Spotting Medium.

Indian ink—Water colour chalk. Payne's grey-Water colour chalk.

Grind together with water only on a palette to match the colour of the negative.

Another spotting medium may be very readily compounded by thinning down ordinary sepia moist water-colour with black writing ink to the consistency of cream.

Blocking-Out Mixtures.

1.—Gamboge and vermilion red, or Payne's grey and vermilion are ground together in water in equal parts with addition of a little gum water if a glossy surface is required.

2.—Commercial "Brunswick black" forms an excellent blocking-out mixture for large work.

3.—When printing on development papers, yellow or orange dye (*e.g.*, Vanguard yellow) is a convenient blocking-out medium which is easier in use owing to its transparency. First go over the film with ox-gall on wet cotton wool; the dye then diffuses slightly beyond the edge of the brush work and avoids harsh lines. In subjects containing detail such as ladies' hair, or drapery, a weak dye application over the outline will add the necessary density to the background without clogging the hair. Then proceed as usual with a stronger wash, when stray bits not wanted to print can be taken off without leaving a sharp edge.

Titles on Negatives.

The usual method is to have the words forming the title set up in type and photographed on a "process" plate. The subject negative having been made with a clear margin round it, a strip of the title negative is laid down on this



margin by stripping and the clear margin then filled up with "Photopake" or other blocking out mixture except over the strip of title, which is made dense enough, in the first instance, to print white. If a clear portion in a landscape negative cannot be found (in cases where the title has to appear on the view), a piece must be cut out with a sharp knife.

An alternative method, shown in the illustration, is to cut away part of the negative film (round the subject), lay on the title strip and then fill in with opaque except over the title strip.

STRIPPING.

Glass Negatives.

The following process (of Middleton and Holcroft) is a very reliable one for stripping the film from a glass negative and transferring it (with or without reversal) to a second glass plate or other support.

The materials are :—

Stock solution, made by mixing methylated spirit, 25 ozs. (250 c.c.s.) ; water, 1 oz. (10 c.c.s.) ; glycerine, 1 oz. (10 c.c.s.).

Some commercial hydrofluoric acid. Must be kept in a gutta percha bottle.

Some waxed paper, made by soaking thin note paper in hot melted paraffin wax for about half an hour.

A bow of thin cane fitted with a waxed silk thread.

Wooden window wedges, weak gum solution and a sharp penknife.



Fig. 1.

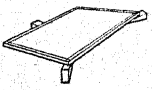


Fig. 2.

Cut through the film all round the negative at a distance of about one-eighth of an inch from the edge (fig. 1).

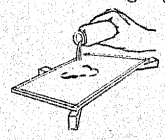


Fig. 3.

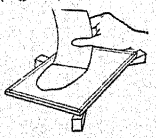


Fig. 4.

Place the negative level on three wooden wedges (fig. 2).

Pour on " stripping solution " made by adding from 6 to 30 drops of hydrofluoric acid to 1 oz. of the stock solution (fig. 3).

Spread the mixture with an end of paper (fig. 4).

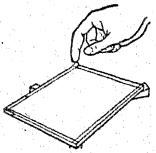


Fig. 5.

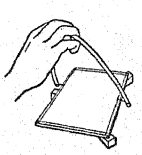


Fig. 6.

After a minute or so try (with the finger) if the edgings of film are loose, and remove them as soon as they come away without any pull whatever (fig. 5).

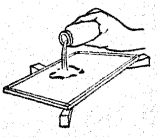


Fig. 7.

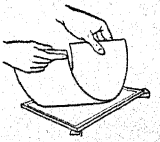


Fig. 8.

Now test if the whole film is loose by passing the waxed silk thread underneath (fig. 6).



Fig. 9.



Fig. 10.

If all is free, pour on some plain stock solution (fig. 7), and apply a sheet of waxed paper (fig. 8).

Squeegee down the waxed paper lightly (fig. 9).

Then remove paper and negative film together in contact by slipping the blade of a penknife under the film (fig. 10).

Now apply the paper, with the negative film on its under side, to a glass plate previously coated with very weak gum solution, dried and flowed over with stock solution (fig. 11).

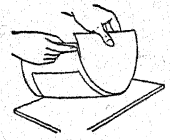


Fig. 11.

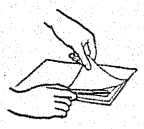


Fig. 12.

Then squeegee down (fig. 9) and remove the waxed sheet, using the blade of the penknife to keep the corner of the film to the glass (fig. 12).

If it is desired to reverse the negative (as regards right and left), the film is transferred from the first sheet of waxed paper (fig. 10) to a second sheet of the same material. Sheet No. 1 is then pulled off and the negative film applied to a glass plate prepared with gum, etc., as already described.

FOR OLD NEGATIVES.

A less rapid solution, but one which will be safe in the case of an old or hardened negative, is :—

Methylated spirit	1 oz.
Water	2 ozs.
Hydrofluoric acid	60 mins.

These proportions may be slightly altered for different commercial spirits and acids.

It is better to use this formula for negatives which may have become hard or horny with age.

Dry Stripping.

A useful and speedy method of stripping the film off glass plates in a dry condition for carbon printing, etc., is the following :—The negative is thoroughly well washed after fixing.

Then immerse for five minutes in a solution of potassium carbonate (9 ozs. potass. carbonate in 8 ozs. water). Remove from the solution and blot off surplus moisture with a soft cloth, rub dry with another cloth, and then cut through the film with a penknife at the top edge.

When thoroughly dry, *i.e.*, in about 10 minutes, insert a needle under the film at the top corner and pull steadily, when the film will be found to leave the glass with perfect ease and certainty. This method appears to have no deleterious effect on the film at all.

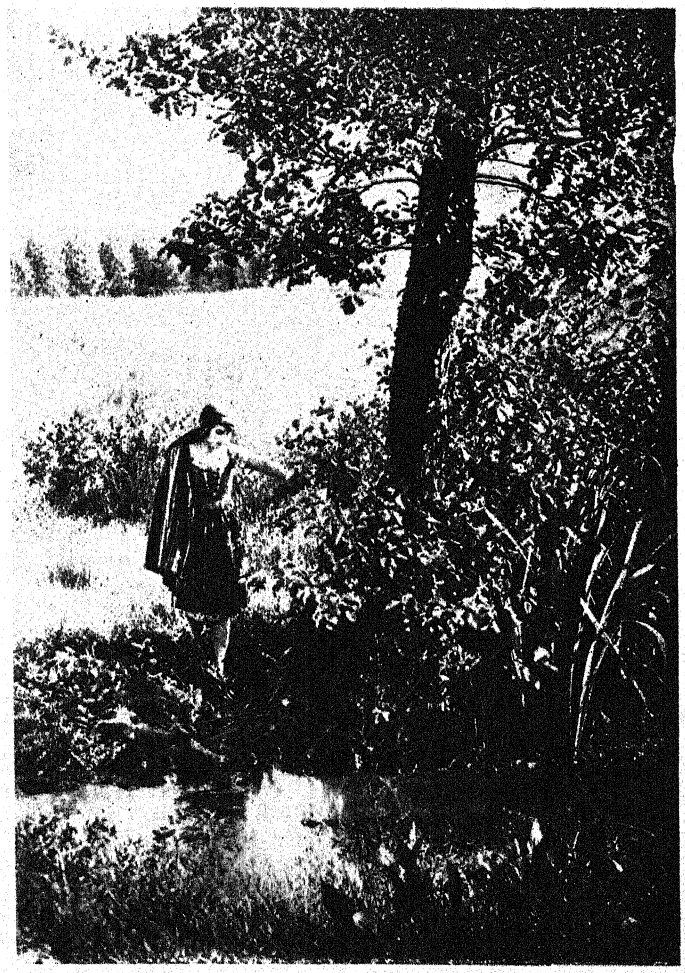
Sterry Process.

The following is also for stripping fims from glass negatives, especially when the negatives are to be permanently kept in the film form.

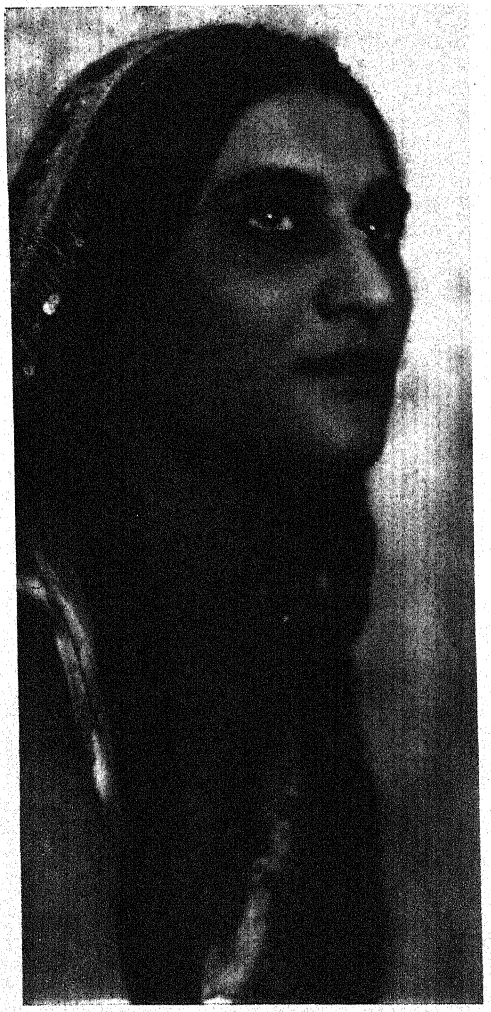
The negatives are immersed for thirty minutes in :—

Potass. carbonate saturated solution	2 ozs.
Glycerine ...	1 oz.
Formaline ...	1 oz.
Tap water ...	50 ozs.

This mixture is cloudy soon after making, and must be either filtered or decanted from the sediment. The plates, after immersion, are stood to drain for a few moments, and the solution mopped off them with an old soft handkerchief made into a pad. They are then put aside, where they will dry slowly



A POLISH MAID E. OSTERLOFF



SUNITA STUART BLACK

and uniformly, requiring, as a rule, at least six hours, and better twelve or more.

To strip them, all that is then necessary is to cut round with a sharp knife about $\frac{1}{16}$ in. from the edge of the plate, when on lifting one corner the film will separate easily, and lie perfectly flat. Longer immersion in the mixture or more formaline added causes the edges of the films to separate and curl up.

A greater proportion of formaline so hardens the film that it splits on drying. Artificial heat makes the stripping irregular, or the film may refuse to leave the glass. The remedy is to allow the plates to stand where they can absorb moisture before stripping.

The process is of no use for stripping negatives on celluloid film.

Film Negatives.

In the case of negatives on celluloid cut or roll-film the following is a suitable method :—

Caustic soda	...	10 grs. (23 gms.)
Formaline	...	10 minims (20 c.c.s.)
Water ...	...	1 oz. (1,000 c.c.s.)

The celluloid negative is immersed in this solution until the film shows signs of detachment, and can be rolled back with the finger. It is then placed in—

Hydrochloric acid		25 minims (50 c.c.s.)
Glycerine	...	25 minims (50 c.c.s.)
Water ...	...	1 oz. (1,000 c.c.s.)

in which it is removed from its original support to a glass or other base.

Wet-Collodion Negatives.

When the negative is thoroughly dry and cool, flow over with thin solution of rubber in benzole, 2 parts pure rubber to 100 parts benzole, or ordinary cycle tyre repairing solution thinned down to about the consistency of collodion will do.

When this is dry, the negative is flowed over with "leather" collodion. This is prepared by adding a small quantity of castor oil to plain collodion. A good formula is as follows :—

Celloidin	...	$\frac{1}{2}$ oz. (5 gms.)
Ether ...	...	5 oz. (50 c.c.s.)
Alcohol ...	...	5 ozs. (50 c.c.s.)
Castor oil	...	$\frac{1}{2}$ oz. (5 c.c.s.)

When the collodion on the negative is dry (the drying can be hastened by heat), the negative is cut round the edges with a knife, and placed in a dish of cold water. The film should soon begin to loosen at the edges; if it does not, a little acetic acid (up to 10 per cent.) may be added to the water.

The film is now transferred to a piece of paper, and thence to the new support. If the negative is to be reversed it is transferred to another piece of paper before being placed on its final support.

PLAIN AND ALBUMEN PAPERS.

The following are formulæ for "salting" and sensitising papers such as Whatman's drawing papers.

Formulæ such as these, which were largely used in the days before the industrial manufacture of printing papers, yield sensitive coatings which keep in good condition only for a few days. Moreover, they require a negative of very considerable vigour; a negative which prints well in P.O.P. is not nearly vigorous enough. In addition to this, it is necessary to over-print to an appreciable extent, since prints lose depth in the toning and fixing baths. Despite these drawbacks, the formulæ are deserving of more notice than they now receive, especially for the sensitising of fabrics such as silk, satin, cotton.

First prepare the plain paper with—

Ammonium chloride ...	60-80 grs. (14-18 gms.)
Sodium citrate ...	100 grs. (23 gms.)
Sodium chloride	20-30 grs. (4·5-7 gms.)
Gelatine... ...	10 grs. (2 gms.)
Distilled water ...	10 ozs. (1,000 c.c.s.)

or—

Ammonium chloride ...	100 grs. (23 gms.)
Gelatine... ...	10 grs. (2 gms.)
Water	10 ozs. (1,000 c.c.s.)

The gelatine is first swelled in cold water and then dissolved in hot water, and the remaining components of the formula are added. The solution is filtered, and, when still warm, the paper floated upon it for three minutes and dried.

The salted paper is sensitised upon a neutral 45-grain silver bath.

PLATINUM TONING BATH.

Potass. chloro-platinite ...	4½ grs. (1 gm.)
Water	10 ozs. (1,000 c.c.s.)
Nitric acid ...	2-3 drops (5-10 drops)

Albumen Paper.

Albumenised paper (now very little used) is sensitised on the following silver solution :—

Silver nitrate ...	600 grs. (140 gms.)
Distilled water ...	10 ozs. (1,000 c.c.s.)

The bath is made just acid with nitric acid, requiring three or four drops per 10 ozs.

TONING BATH.

Gold chloride ...	15 grs. (1 gm.)
Water	4 ozs. (120 c.c.s.)

Add lime water until a piece of red litmus paper, placed in the solution, is turned blue. Then add—

Calcium chloride, fused	120 grs. (4·2 gms.)
Water to make ...	7½ ozs. (115 c.c.s.)

This solution is diluted with 15 times its volume of water to make the toning bath; it can be used over and over again by addition of stock solution.

SELF-TONING PAPERS.

Self-toning papers are made with both collodion and gelatine emulsions; those with the former constitute the larger number of the brands on the market. Generally speaking the gelatine papers yield a greater variety of tones according to the strength of the hypo fixing bath, and the time of immersion of the print. On the other hand the collodion papers exhibit greater certainty in the tone which they yield by simple fixation in hypo.

Printing.

The paper should be exposed under the negative until the picture is considerably darker than the finished print is required to be. With many papers the printing should be continued until the shadows of the picture show a species of metallic bronze, while at the same time the lightest parts of the subject, usually the sky, is quite perceptibly darker than the unexposed paper.

The more rapidly the paper is printed, the greater the degree of over-printing which is necessary; prints which require a very long exposure, owing to the great density of the negative or the weakness of the light, need very little over-printing.

Washing.

Although some makers do not advise it, it is better to wash prints before toning, since this conduces to greater permanency of the results. Prints are washed in running water or in four or five changes of clean water, keeping them on the move.

Collodion prints are very liable to curl up in the wash water to an awkward extent. This can be avoided by placing them in the first instance in very little water—only enough to cover one or two prints. Several prints are laid face down in this water one after the other, placing each one in as soon as the preceding one has been wetted all over, and before it has had time to curl. The upper prints thus keep those below them fairly flat, and the prints show much less curl during the further washing, etc., in a greater depth of water or fixing solution.

Fixing-Toning.

The prints are fixed and at the same time toned to a rich sepia colour by immersion in a plain solution of hypo. The makers' instructions should be followed A very usual strength is:

Hypo	... ...	4 ozs. (100 gms.)
Water	... ...	20 ozs. (500 c.c.s.)

With some papers it is an advantage to add a pinch or two of bicarbonate of soda to the fixing bath. This is especially so in the case of papers which it is directed should not be washed before fixing.

Purple Tones.

In place of the first washing in water, prints are soaked for about 5 minutes in:—

Common salt	...	2 ozs. (50 gms.)
Water ...	...	20 ozs. (500 c.c.s.)

They are then washed in two changes of water and then fixed as directed above.

Two-Colour Prints.

Very pleasing colour effects can be obtained by painting parts of the dry print with the above salt solution, using a camel hair brush. On then fixing the whole print in the ordinary way, the parts which have been treated with the salt will tone to a purple, whilst the untreated parts will come out a warm brown. Especially with portraits, this process yields some very pleasing results.

GELATINE P.O.P.

Emulsion.

Gelatine...	...	175 grs. (80 gms.)
Ammonium chloride	...	18 grs. (8 gms.)
Rochelle salts	...	50 grs. (23 gms.)
Silver nitrate	...	75 grs. (34 gms.)
Alcohol ...	...	4 drs. (100 c.c.s.)
Water ...	...	5 ozs. (1,000 c.c.s.)

The gelatine in the formula is a mixture of equal parts of Nelson's No. 1 and Coignet's.

Heat to 100° F. (38° C.) and allow to remain at this temperature after all is dissolved for ten minutes, after which proceed in the usual way.

P.O.P. Procedure.

Wash prints in several changes of water until wash water ceases to show milkiness when poured into clean glass measure (time, 10 to 15 minutes). Tone in gold bath (5 to 10 minutes). Again wash as thoroughly as before toning. Fix in :—Hypo, 2 to 3 ozs. ; water, 20 ozs., for 10 minutes. Finally wash in running water or frequent changes (every 5 or 10 minutes) for 1 to 2 hours.

Prints can be toned in a platinum bath instead of in one of gold (see formula below). The other manipulations remain the same as above. Platinum tones are best suited to matt surface paper.

Prints can be toned and fixed at the same time in a "combined" bath (see formula below). With some baths and papers it is best to wash before toning ; with others it is not necessary. The tones by the "combined" method are almost always warmer than by separate toning and fixing. Also they are somewhat inferior in permanence.

Gold Toning Bath.

The following is the best and most generally used toning bath for P.O.P., and yields fine purplish tones.

Gold chloride	...	2½ grs. (0·3 gm.)
Ammonium sulphocyanide	...	30 grs. (3·5 gms.)
Water ...	...	20 ozs. (1,000 c.c.s.)

It is necessary for this and all sulphocyanide baths to ripen. The best method of mixing is to boil the water and to dissolve the gold in one half and the sulphocyanide in the other—

both scalding hot. Then pour the gold into the sulphocyanide in small doses, stirring all the time; use when cool. If cold water is used, the mixture should be allowed to stand 12 hours.

STOP FOR GOLD TONING.

A weak solution of soda sulphite (5 grs. per oz.) at once stops the action of a gold toning bath.

SALT BATH.

A short immersion of prints in the following bath prior to the first washing favours even toning and prevents spots and stains from rusty tap water:—

Salt	2 ozs. (100 gms.)
Sodium carbonate	1 oz. (50 gms.)
Water	20 ozs. (1,000 c.c.s.)

If prints are to be toned in the platinum bath the carbonate should be omitted.

Combined Baths.

ALKALINE TONE-FIXING BATH.

Gold chloride ...	2 grs. (0·23 gm.)
Lead nitrate ...	10 grs. (1·2 gm.)
Chalk	½ oz. (25 gms.)
Hypo	4 ozs. (200 gms.)
Water	20 ozs. (1,000 c.c.s.)

Shake the solution well, allow to settle, and use the clear portion. If prints tone too quickly, under 10 minutes, in the combined bath it is best to pass them afterwards through a plain fixing bath of: hypo, 3 ozs.; water, 20 ozs. This ensures prints receiving ample fixation, which otherwise they might not get whilst in the combined toning and fixing bath.

VALENTA'S.

Hypo	8 ozs. (400 gms.)
Ammonium sulphocyanide ...	1 oz. (50 gms.)
Lead nitrate ...	175 grs. (20 gms.)
Alum	350 grs. (40 gms.)
Water to ...	20 ozs. (1,000 c.c.s.)

Dissolve the hypo in the water, add the sulphocyanide, then add the alum dissolved in a little water, and also the lead, and add to the hypo. Heat the mixture to 120 deg. F. for ten minutes; allow to cool. For use take—

Stock solution (as above)	10 ozs. (100 c.c.s.)
Water	10 ozs. (100 c.c.s.)
Gold chloride (from stock sol.) ...	3½ grs. (0·08 gm.)

Reducer for Dark P.O.P.'s.

The best reducer for overprinted P.O.P.'s is one made up at the time of use from 10 per cent. stock solutions of (A) ammonium sulphocyanide and (B) potass. ferricyanide. The reducing solution consists of:—

A.	5 ozs. (10 c.c.s.)
B.	½ oz. (1 c.c.)
Water	24 ozs. (50 c.c.s.)

This is used on the prints after toning, fixing and well washing out the hypo in the usual way.

This reducer acts perfectly on P.O.P. prints, even after gold toning. If anything, it improves the tone of the print by rendering it somewhat cooler,

Platinum Toning.

PHOSPHORIC ACID.

Potass. chloroplatinite	4 grs. (0·45 gm.)
Phosphoric acid (sp. gr. 1·12)	¾ oz. (fl.) (35 c.c.s.)
Water to ...	20 ozs. (1,000 c.c.s.)

CITRIC ACID.

Potass. chloroplatinite	4 grs. (0·45 gm.)
Sodium chloride (salt)	40 grs. (4·5 gms.)
Citric acid	50 grs. (5·8 gms.)
Water to ...	20 ozs. (1,000 c.c.s.)

HADDON'S FORMULA.

Platinum perchloride	3 grs. (0·2 gm.)
Sodium formate	100 grs. (6·5 gms.)
Formic acid ...	30 minims (1·8 c.c.)
Water to ...	35 ozs. (1,000 c.c.s.)

STOP FOR PLATINUM TONING.

A weak solution of sodium carbonate (10 grs. per oz.) instantly arrests the toning action of a platinum bath.

Developing P.O.P.

PAGET BROMIDE PROCESS.

The prints are immersed in 10 per cent. potass. bromide solution for five or ten minutes, washed and developed with the following :—

A.	Hydroquinone	40 grs. (4·5 gms.)
	Sodium sulphite ...	160 grs. (18 gms.)
	Water to ...	20 ozs. (1,000 c.c.s.)
B.	Potass. bromide ...	2½ ozs. (125 gms.)
	Sodium carbonate	2 ozs. (100 gms.)
	Water to ...	20 ozs. (1,000 c.c.s.)
C.	Potass. cyanide	½ oz. (25 gms.)
	Water	20 ozs. (1,000 c.c.s.)

For average negatives, mix:—A, ½ oz.; B, 1 oz.; C, 20 minims; water, ½ oz.

For flat negatives (greater contrast), A, 3 drs.; B, 1 oz.; water, 5 drs.

For hard negatives (soft results), A, 7 drs.; B, 1 oz.; water, 1 dr.

The cyanide solution is used as above in quantity sufficient to keep the backs of prints clean.

ACID DEVELOPER.

A stock solution is made of :—

Pyro	60 grs. (24 gms.)
Metol	60 grs. (24 gms.)
Acetic acid ...	1½ drs. (30 c.c.s.)
Water	6 ozs. (1,000 c.c.s.)

The working developer is made by mixing ½ oz. of this stock solution with 16 ozs. of water at the time of use.

The developer should be used in a perfectly clean glass dish and kept moving over the print until the required depth is reached. This usually takes from 1 to 2 minutes. Plenty of the developer should be used, and it should be discarded as soon as it becomes turbid or muddy.

Without rinsing, the prints should be transferred to a fixing bath composed of :—

Hypo	2 ozs. (200 gms.)
Soda sulphite ...	½ oz. (50 gms.)
Water	20 ozs. (2,000 c.c.s.)

BROMIDE AND GASLIGHT PAPERS.

Amidol Developer.

Soda sulphite cryst.	650 grs. (74 gms.)
Potass. bromide	10 grs. (1·2 gm.)
Water	20 ozs. (1,000 c.c.s.)

When dissolved, add—

Amidol	50 grs. (5·7 gms.)

This developer will not keep more than three days.

The most convenient method of making amidol developer for bromide papers is to make up a 10 per cent. solution of sodium sulphite, and add 5 grs. potassium bromide to each 10 ozs. solution. For use add 4 grs. dry amidol to each ounce of solution, and dilute with an equal bulk of water. For best colour of prints, the sulphite solution should be made fresh each day.

Metol-Hydroquinone.

A. Metol ...	32 grs. (3·6 gms.)
Hydroquinone	120 grs. (13·7 gms.)
Alcohol ...	2 ozs. (100 c.c.s.)

Mix and shake well but will not all dissolve.

B. Soda sulphite, cryst.	3 ozs. (150 gms.)
Soda carbonate, crystals	3 ozs. (150 gms.)
Potass. bromide	8 grs. (1 gm.)
Water, about...	10 ozs. (500 c.c.s.)

Heat water to about 130° F. and add soda sulphite. Continue heating to nearly boiling point, meantime adding soda carbonate. When all is dissolved, pour hot solution B. into solution A. and add the potass. bromide. Then add water to make solution up to 20 ozs. (1,000 c.c.s.).

For bromide papers, use one part stock to three parts water. For gaslight papers, one part stock to one part water. This developer gives excellent results with practically all makes of bromide and gaslight papers. It keeps for at least 18 months when stored in well-corked bottles filled to the neck, and has been found to retain its properties, as regards the colour and vigour of developed prints, for twice this period.

Reducers for Bromides.

Over-Developed Prints.

Over-developed prints are best treated in a *weak* iodine-cyanide reducer made from (A) 10% solution of iodine in potass. iodide and (B) 10% potass. cyanide solution.

Take :—

A.	30 minims (2 c.c.s.)
B.	10 minims (0·6 c.c.)
Water	2 ounces (60 c.c.s.)

adding more of A and B solutions if necessary.

For making the iodine solution see under "Negative Reducers" earlier in this section.

Over-Exposed Prints.

Harden the print well, wash and dry. Re-soak in water till limp and apply a reducer made from the following two stock solutions :—

A	Potass. permanganate	1 gr. (0·05 gm.)
	Water to ...	1 dm. (3 c.c.s.)
B.	Common table salt	40 grs. (2·3 gms.)
	Sulphuric acid	10 minims (0·5 c.c.s.)
	Water to make	10 ozs. (250 c.c.s.)

Immediately before use, mix A solution 1 drm. (3 c.c.s.), B solution 10 ozs. (250 c.c.s.), and dilute, if necessary, to slow the action conveniently.

When sufficiently reduced, the print is thoroughly rinsed, and fixed for 10 mins. in a 10 per cent. fixing bath, preferably one of the acid variety.

Any residual brownish permanganate stain is removed from the well washed print by the following bath :—

Hydrochloric acid, 200 minims (20 c.c.s.) ; Common salt, 25 grs. (2·8 gms.) ; Soda sulphite (anhydrous) 25 grs. (2·8 gms.) ; Water to make 20 ozs. (1,000 c.c.s.). A final wash completes the treatment.

Clearing Bath.

To remove yellow stain from bromide prints, the following is a suitable solution :—

Alum (saturated solution)	10 ozs. (1,000 c.c.s.)
Hydrochloric acid	3 drs. (40 c.c.s.)

Prints from Flat Negatives.

Prints of good contrast can be made as follows : The paper is fully exposed and over-developed, fixed and washed. The prints are then placed in the following iodine bath until whites are strongly blue, and then fixed for five minutes.

IODINE BATH.

Potass. iodide ...	30 grs (7 gms.)
Iodine	3 grs. (0·7 gm.)
Water	10 ozs. (1,000 c.c.s.)

If not sufficiently lightened, the print may be washed and the process with bleaching bath and hypo repeated.

Stress Marks on Bromides.

Avoid rubbing paper against other sheets in boxes or packet and against negative or mask. In cutting up large sheets, use shears on open sheet, not knife, etc., which rubs on emulsion surface. Have developer water-clear, free from sediment and any floating dirt. Use plenty of developer.

Addition of from 40 to 60 minims of 10 per cent. solution of potass. cyanide to each 10 ozs. of developer will avoid stress marks in many cases, or a developer may be made up according to the formula :—

Soda sulphite cryst.	1 oz. (50 gms.)
Water	20 ozs. (1,000 c.c.s.)
Potass. bromide	2 grs. (0·23 gm.)
Amidol	35 grs. (4·0 gms.)
Potass. cyanide...	2 grs. (0·23 gm.)

If stress marks occur, they can usually be removed by gently rubbing each print with a soft rag as soon as it has had a minute or so in the wash-water. A further aid to removal is a solution of borax, ½ oz. ; water, 20 ozs. ; methylated spirit, 5 ozs., rubbed over with soft rag or cotton wool

Sulphide Toning.

Of the many methods of producing sepia to warm brown tones on bromide or gaslight the following is the best and most reliable. The prints are bleached in a bath of ferricyanide and bromide, briefly washed and darkened or toned in a solution of soda sulphide. Prints require to be well washed from hypo before being put into the bleacher. In summer, or in places where the water supply has a softening action on prints, it is well to fix them in a fixing hardening bath. (See "Fixing.")

Bleacher.

Ammonium bromide	100 grs. (11 gms.)
Potass. ferricyanide	300 grs. (35 gms.)
Water	20 ozs. (1,000 c.c.s.)

Sulphide Bath.

It is best to keep the soda sulphide in strong 20 per cent. solution; a weak solution does not keep well. Use the pure *white* sodium sulphide, dissolving 4 ozs. in water and making up to 20 ozs. with water.

To make the working sulphide bath, mix:—

Stock 20% sulphide soln.	3 ozs.
Water to make ...	20 ozs.

The prints are treated for two or three minutes in the bleacher —that is, until the picture becomes faint brown in colour. If any black is left at the end of two minutes it is a sign that the bleacher (which may be used repeatedly) is becoming pretty nearly exhausted.

Rinse in clean water for half-a-minute to one minute. Longer washing at this stage does no good and may impair the tone.

Transfer to sulphide bath, where prints should darken to the full brown or sepia in a second or two

Throw away the sulphide bath after the day's use. Stale spoilt sulphide solution is the most frequent cause of bad tones or of refusal of prints to darken in the sulphide bath.

Finally wash for half-an-hour in running water.

The results by the sulphide process are quite permanent.

Blue stains, in spots and patches, on sulphide-toned prints are due to iron, either as rust in the tap-water or as impurity in alum. Fit a flannel filter to the tap and use pure alum. Wiping with cotton-wool saturated with strong hydrochloric acid will slowly change the stain to yellow, which washes out in water. But it is a rather risky remedy.

Sulphide-toned prints of bad colour or insufficient depth can be re-treated, *e.g.*, by bleaching in:—copper bromide, 130 grs.; sodium bromide, 2½ ozs.; water, 10 ozs. This is used in the dark room, the bleached print taken into daylight and re-developed with amidol or other clean developer, after which it may be re-toned. The Greenall permanganate bleach can also be used instead of the copper.

Over-dark sulphide-toned prints of light subjects, *e.g.*, sketch portraits or enlargements which are afterwards to be worked up, may be reduced by putting back into the ferricyanide-bromide bleach after washing.

Permanganate Process.

(T. H. Greenall's formula.)

This process allows of prints being toned after a very brief rinse from the fixing bath provided each print is treated singly in a dish. It requires the briefest washing between bleaching and sulphiding.

BLEACHER.

A.	Hydrochloric acid B.P. 31·8	3 ozs. (150 c.c.s.)
	Water to	20 ozs. (1,000 c.c.s.)
B.	Potass. permanganate	40 grs. (4·5 gms.)
	Water ...	20 ozs. (1,000 c.c.s.)

Both A and B keep indefinitely when well stoppered.

To make the bleacher, mix in order given :—Water, 6 ozs. ; A, 1 oz. ; B, 1 oz. If prints do not bleach completely, throw bleacher away and mix fresh. Any brown stain disappears in the sulphide bath, which should be of strength 1 gr. per oz. made up from strong solution.

If, by using more of A or B than directed above, there is any brown stain on sulphided prints, a bath of oxalic acid, ½ oz. ; water, 50 ozs., with crystals of soda sulphite dissolved in it, will at once remove it.

Liver of Sulphur Toning.

Liver of sulphur	60 grs. (4 gms.)
Water ...	80 ozs. (2,000 c.c.s.)

This bath is used at about 80 deg. F., and tones in about 30 minutes, yielding results very similar to those with hypo-alum. Commercial papers are not, however, all equally suitable for "liver" toning

Hypo-Alum Toning.

The following is the method (much used on the commercial scale) for toning bromide and gaslight prints to a warm purplish sepia. Prints must be fixed in a hardening-fixing bath. They are then toned in a hot mixture of hypo, alum, etc., made as follows :—

Hot water ...	80 ozs. (2,000 c.c.s.)
Hypo	1 lb. (400 gms.)

Dissolve, and then add—

Alum	3½ ozs. (90 gms.)

Stir well, boil for 2 or 3 minutes, cool to about 150 F. (65 C.), and then add the Silver ripener, made as below :

Stir well again and add :

Potass. iodide ...	40 grs. (3 gms.)

The whole mixture is thoroughly well stirred.

Silver Ripener.

Silver nitrate	20 grs. (1 gm.)
Water ...	1 oz. (30 c.c.s.)

To this add drop by drop, strong (880) ammonia, until the precipitate first formed is just re-dissolved. Stir vigorously while adding the ammonia.

The toning bath can be used repeatedly, keeping up the bulk by occasional addition of fresh solution. The best results are obtained by keeping the bath hot, or as warm as the emulsion will stand, say 100° to 120° F. (38° to 50° C.). At this temperature prints will tone in from 20 to 30 minutes. The bath can be used cold, in which case toning takes about 24 hours, the prints requiring to be turned over every little while.

After using the hot bath, it is well, after toning, to pass the prints through a solution of:

Alum	2 ozs. (30 gms.)
Water	70 ozs. (1,000 c.c.s.)

Prints are finally washed thoroughly in water.

Green Tones.

A. Potass. ferricyanide...	180 grs. (2 gms.)
Water, distilled	20 ozs. (100 c.c.s.)
B. Vanadium chloride stock soln.	3¼ drs. (4 c.c.s.)
Ferric ammonia citrate (*green*)	45 grs. (1 gm.)
Soda citrate neutral (Merck)	2½ ozs. (25 gms.)
Ammonium chloride	90 grs. (2 gms.)
Hydrochloric acid	1½ ozs. (14 c.c.s.)
Water distilled	10 ozs. (100 c.c.s.)

The hydrochloric acid is the "pure strong" of 1·16 sp. gr.

The stock vanadium solution is made by mixing 1 oz. of vanadium chloride, as purchased (Merck's syrupy), with 5 drams (18 c.c.s.) of strong hydrochloric acid and then adding distilled water to make 2 ozs. 90 minims (62 c.c.s.) in all.

In making up the B solution first add the hydrochloric acid to the vanadium solution. Then dissolve the ferric citrate, soda citrate, and ammonium chloride in 100 c.c.s. water and mix the two. Solution should be dull mauve blue; not green—until mixed with A.

Both A and B solutions will keep for months at least.

To mix the toning solution, take 1 part A with 4 parts water, and separately, 1 part B with 4 parts water. The two weak solutions when mixed together form the toner.

Prints tone in from 4 to 8 minutes. Rock constantly, then wash in 5 changes of water, each of 2 minutes, give a bath of hydrochloric acid (1 part in 50 parts water) for 2 minutes, and finally wash for 15 minutes in 7 or 8 changes of water.

Prints should be of the ordinary depth. The green tone is permanent.

Copper Toning.

A. Copper sulphate	60 grs. (7 gms.)
Potass. citrate	240 grs. (28 gms.)
Water ...	20 ozs. (1,000 c.c.s.)
B. Potass. ferricyanide	50 grs. (6 gms.)
Potass. citrate	240 grs. (28 gms.)
Water ...	20 ozs. (1,000 c.c.s.)

The citrate in this formula is the neutral salt.

Use equal parts of each. If prints are pinkish in the highlights use more citrate in the A or B solution.

Uranium Toning.

This old method yields brown to reddish tones. It intensifies the prints, and the results often prove impermanent.

A. Uranium nitrate	90 grs. (10 gms.)
Water ...	20 ozs. (1,000 c.c.s.)

Permanganate Process.

(T. H. Greenall's formula.)

This process allows of prints being toned after a very brief rinse from the fixing bath provided each print is treated singly in a dish. It requires the briefest washing between bleaching and sulphiding.

BLEACHER.

A.	Hydrochloric acid B.P. 31·8	3 ozs. (150 c.c.s.)
	Water to	20 ozs. (1,000 c.c.s.)
B.	Potass. permanganate	40 grs. (4·5 gms.)
	Water ...	20 ozs. (1,000 c.c.s.)

Both A and B keep indefinitely when well stoppered.

To make the bleacher, mix in order given :—Water, 6 ozs. ; A, 1 oz. ; B, 1 oz. If prints do not bleach completely, throw bleacher away and mix fresh. Any brown stain disappears in the sulphide bath, which should be of strength 1 gr. per oz. made up from strong solution.

If, by using more of A or B than directed above, there is any brown stain on sulphided prints, a bath of oxalic acid, ½ oz. ; water, 50 ozs., with crystals of soda sulphite dissolved in it, will at once remove it.

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Hot water ...	80 ozs. (2,000 c.c.s.)
Hypo	1 lb. (400 gms.)

Dissolve, and then add—

Alum	3½ ozs. (90 gms.)

Stir well, boil for 2 or 3 minutes, cool to about 150 F. (65 C.), and then add the Silver ripener, made as below :

Stir well again and add :

Potass. iodide ...	40 grs. (3 gms.)

The whole mixture is thoroughly well stirred.

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Silver nitrate	20 grs. (1 gm.)
Water ...	1 oz. (30 c.c.s.)

To this add drop by drop, strong (880) ammonia, until the precipitate first formed is just re-dissolved. Stir vigorously while adding the ammonia.

The toning bath can be used repeatedly, keeping up the bulk by occasional addition of fresh solution. The best results are obtained by keeping the bath hot, or as warm as the emulsion will stand, say 100° to 120° F. (38° to 50° C.). At this temperature prints will tone in from 20 to 30 minutes. The bath can be used cold, in which case toning takes about 24 hours, the prints requiring to be turned over every little while.

After using the hot bath, it is well, after toning, to pass the prints through a solution of:

Alum	2 ozs. (30 gms.)
Water	70 ozs. (1,000 c.c.s.)

Prints are finally washed thoroughly in water.

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Water, distilled	20 ozs. (100 c.c.s.)
B. Vanadium chloride stock soln.	3¼ drs. (4 c.c.s.)
Ferric ammonia citrate (*green*)	45 grs. (1 gm.)
Soda citrate neutral (Merck)	2½ ozs. (25 gms.)
Ammonium chloride	90 grs. (2 gms.)
Hydrochloric acid	1½ ozs. (14 c.c.s.)
Water distilled	10 ozs. (100 c.c.s.)

The hydrochloric acid is the "pure strong" of 1·16 sp. gr.

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Both A and B solutions will keep for months at least.

To mix the toning solution, take 1 part A with 4 parts water, and separately, 1 part B with 4 parts water. The two weak solutions when mixed together form the toner.

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Prints should be of the ordinary depth. The green tone is permanent.

Copper Toning.

A. Copper sulphate	60 grs. (7 gms.)
Potass. citrate	240 grs. (28 gms.)
Water ...	20 ozs. (1,000 c.c.s.)
B. Potass. ferricyanide	50 grs. (6 gms.)
Potass. citrate	240 grs. (28 gms.)
Water ...	20 ozs. (1,000 c.c.s.)

The citrate in this formula is the neutral salt.

Use equal parts of each. If prints are pinkish in the highlights use more citrate in the A or B solution.

Uranium Toning.

This old method yields brown to reddish tones. It intensifies the prints, and the results often prove impermanent.

A. Uranium nitrate	90 grs. (10 gms.)
Water ...	20 ozs. (1,000 c.c.s.)

B. Potass. ferricyanide ...	90 grs. (10 gms.)
Water	20 ozs. (1,000 c.c.s.)

Use equal parts of A and B, and add 20 minims of glacial acetic acid to each ounce of mixture. The prints must be free from hypo. After toning wash in several changes of *still* water till the high-lights are clear. Washing in running water will remove the toning in patches. Citric acid (10 grs. per oz.) or oxalic acid (5 grs. per oz.) instead of acetic is an aid to pure whites.

As a means of rendering uranium-toned prints permanent it is recommended to fix the toned prints for five minutes in hypo, ½ oz.; potass. metabisulphite, 70 grs.; water, 20 ozs.

Blue Tones.

Mix 10 per cent. solutions of the three following chemicals :—

Ferric ammonia citrate	2 ozs. (10 c.c.s.)
Potass. ferricyanide	2 ozs. (10 c.c.s.)
Acetic acid ...	20 ozs. (100 c.c.s.)

The well-washed prints are immersed in this bath until the desired tone is given. Then well wash until high-lights are clear. This bath intensifies the image.

Gold Toning.

This process considerably improves the colour of greenish or rusty black prints, and if allowed to act for some time bluish tones are obtained.

Ammonium sulphocyanide ...	30 grs. (2 gms.)
Chloride of gold	2 grs. (0·13 gm.)
Boiling water ...	4 ozs. (110 c.c.s.)

Use as soon as cool. Place the wet print face upwards on a sheet of glass, squeegee into contact, blot off superfluous moisture, and paint the above bath on with a broad flat brush; when the desired tone is reached wash well and dry.

Glazing Prints.

GLAZING SOLUTION.

For the highest gloss and greatest certainty of stripping, it is best to use a glazing solution. This may be bought ready made or prepared from :—

Ox-gall, prepared	1 oz. (12 c.c.s.)
Water	80-160 ozs. (1,000 to 2,000 c.c.s.)

The prints are soaked in this solution for a minute or two and laid on the glasses without intermediate washing.

Those who do not object to the mess (and smell), may prepare ox-gall by buying gall-bladders from a butcher or slaughter-house, and mixing the fluid from a bladder with formaline in the proportion of about 2 ozs. formaline per gallon of gall. The mixture is filtered through several thicknesses of butter muslin, after which it is bottled and will keep for a long time.

A polishing medium to be applied to glass or ferrotype before squeegeeing the print is—

Beeswax ...	20 grs. (45 gms.)
Turpentine or	1 oz. (1,000 c.c.s.)
Spermaceti wax	20 grs. (45 gms.)
Benzole	1 oz. (1,000 c.c.s.)

a few drops of which are rubbed on with a piece of flannel, and the glass afterwards polished with silk rag or chamois leather.

ENAMEL COLLODION.

Soluble gun cotton	50 grs. (14 gms.)
Alcohol	4 ozs. (500 c.c.s.)
Sulphuric ether	4 ozs. (500 c.c.s.)

Glass plates cleaned with French chalk are coated with the above, and, as soon as coating has set, slipped under prints which are waiting face down in water. Prints are withdrawn and squeegeed. When half dry they are given a backing paper, and finally stripped off. (For both gelatine and collodion prints.)

" Necoloidine " replacing the ex-enemy " celloidin " for the making of enamel collodion as well as for wet-collodion plates, etc., is now a manufacture of Necol Industrial Collodions, Ltd., Windsor House, Victoria Street, London, S.W. 1.

Drawings from Ink or Prints.

The following process can be used with prints on bromide, gaslight or P.O.P. paper.

After outlining the subject in waterproof Indian ink, bleach out the image in—

Thiocarbamide ...	240 grs. (25 gms.)
Nitric acid ...	4 drs. (fl.) (25 c.c.s.)
Water	20 ozs. (1,000 c.c.s.)

Or the following bleaching solution may be used :—

Iodine soln. ...	30 minims (6 c.c.s.)
Potass. cyanide	5 minims (1 c.c.)
Water	1 oz. (100 c.c.)

The iodine and cyanide solutions are each of 10 per cent. strength. The iodine is dissolved with aid of potass. iodide ; the cyanide in plain water.

THE CARBON PROCESS.

Procedure.—Tissue, *i.e.*, paper coated with a mixture of gelatine and pigment colour, is made sensitive by immersion in bichromate solution, dried, and printed under the negative by daylight. As the colour of the tissue hides the effect of light, the printing is done by aid of an actinometer.

The effect of the light is to render the gelatine insoluble—deeper down into the tissue, the greater the action. " Development " consists in dissolving out in warm water the tissue which remains soluble.

As a skin of insoluble tissue is formed over the whole top surface of the print, the coating is first transferred (face down) on to a fresh support.

To do this, the exposed tissue is soaked in cold water along with a sheet of (gelatine-coated) transfer paper, the two squeegeed together, put under pressure for about 20 minutes, and then placed in hot water.

The original support of the sensitive surface is stripped off, leaving the tissue with its face (the insoluble side) on the transfer paper. The soluble gelatine can be then dissolved away (development), carrying the pigment with it, and the prints are finally passed through

an alum bath, washed and dried. As this transference of the print to a new support causes the picture to appear reversed as regards right and left, it is necessary (where this is an objection) to transfer first on to a "temporary support" for development, and from this again on to the "final support."

Sensitising Solutions.

Potass. bichromate	1 oz. (35·50 gms.)
Water	20-30 ozs. (1,000 c.c.s.)
Liquor ammonia, 0·880	60 minims (6 c.c.s.)

A longer immersion in the weaker solution is practically equal to a shorter one in the stronger bath.

If the tissue is squeegeed on a glass plate after sensitising, the degree of squeegeeing (light or heavy) also modifies its sensitiveness by removing more or less of the solution.

If the tissue be squeegeed on to a ferrotype plate, and allowed to dry upon it, the drying may be done in the light of an ordinary room. The face of the tissue is then protected from light, dust, and injurious vapours.

FIXING OR HARDENING BATH.

Alum	1 oz. (50 gms.)
Water	20 ozs. (1,000 c.c.s.)

The following sensitising bath has also been recommended :—

Potass. bichromate	1 oz. (20 gms.)
Water	50 ozs. (1,000 c.c.s.)
Citric acid ...	¼ oz. (5 gms.)
Liquor ammonia	quant, suff.

This bath is suitable for thin negatives, *i.e.*, those lacking in contrasts, and the tissue sensitised in it will keep longer than that sensitised in the former solution. The tissue, however, is much less sensitive, and with vigorous or contrasty negatives, such as are best suited for carbon work, it is apt to yield prints that are hard, through the washing away of the more delicate tones in the development.

Bichromate Stains, Etc.

To remove bichromate stains from fingers, nails, etc., apply dilute ammonia to the parts until the stains disappear, then well wash the hands with warm water and soap.

Waxing Solutions.

No. 1 formula is for carbon prints or for removing collodion films.

1. Beeswax ...	20 grs. (10 gms.)
Benzole rect.... No. 1	4 ozs. (1,000 c.c.s.)

No. 2 formula is for flexible supports.

2. Yellow resin	180 grs. (42 gms.)
Yellow beeswax	60 grs. (14 gms.)
Rect. spirit ... of turpentine	10 ozs. (1,000 c.c.s.)

Carbon Transparencies.

The following is a substratum for use in making carbon transparencies.

Nelson's No. 1 ... gelatine	¾ oz. (37 gms.)
Water	20 ozs. (1,000 c.c.s.)
Potass. bichromate	12 grs. (1·4 gm.)

Well cleaned plates are coated with this and dried, when they

are fully exposed to light, which will render the coating insoluble.

Gelatine Solutions.

For transferring carbon pictures from flexible support to ivory opal, glass, &c.

Nelson's No. 1 gelatine	1 oz. (50 grms.)
Water	20 ozs. (1,000 c.c.s.)
Chrome alum ...	12 grs. (1·4 gm.)

The chrome alum is previously dissolved in 2 ozs. (100 c.c.s.) of water and the solution added to that of the gelatine.

For coating, drawing-papers for the single transfer process

Nelson's No. 1 gelatine	1 oz. (50 grms.)
Water	20 ozs. (1,000 c.c.s.)
Chrome alum ...	20 grs. (2·3 grms.)

Apply with a brush.

The chrome alum is previously dissolved in 2 ozs (100 c.c.s.) of water and the solution added to that of the gelatine.

In adding a solution of chrome alum to one of gelatine, both solutions should be at a fairly high temperature, 130° to 160°F.

THE CARBRO PROCESS.

In this process a carbon print is made from a bromide print or enlargement without the aid of daylight.

A good bromide print must first be prepared, care being necessary to ensure correct exposure and full development. Weak, flat bromides give unsatisfactory results.

The print, which has been thoroughly washed and dried, is placed in a dish of clean water, and should remain in this until quite limp or until required.

A piece of carbon tissue of the required size, which must be about $\frac{1}{4}$ in. larger each way than the bromide print, is "sensitised" by immersion for three minutes in the "sensitising bath" given below containing potassium bichromate, ferricyanide and bromide.

During this time the bromide print should be removed from the water and laid face upwards on a sheet of stout glass.

When the tissue has been in the "sensitising" bath for the requisite time it is removed, and allowed to drain for 15 seconds. It is then placed in the acid-formaline bath. The time of immersion in this solution varies according to the brilliancy desired in the resulting print, and may be from 15 to 25 seconds, the longer immersion giving greater softness.

STOCK SOLUTION NO. 1.

(*For making Sensitising Bath.*)

Potass. bichromate	1 oz. (10 grms.)
Potass. ferricyanide	1 oz. (10 grms.)
Potass. bromide	1 oz. (10 grms.)
Water	20 ozs. (200 c.c.s.)

Sensitising Bath for Use.

Stock solution No. 1	6 ozs. (100 c.c.s.)
Water	18 ozs. (300 c.c.s.)

This bath may be used repeatedly, but should be strained

through fine muslin or cotton wool after use.

STOCK SOLUTION No. 2.
(*For Acid-Formaline Bath.*)

Acetic acid, glacial	1 oz. (10 c.c.s.)
Hydrochloric acid, pure	1 oz. (10 c.c.s.)
Formaline ...	22 ozs. (220 c.c.s.)
Water	1½ ozs. (15 c.c.s.)

The formaline is the commercial 40 per cent. solution of formaldehyde.

Acid-Formaline Bath for Use.

Stock solution No.2	1 oz. (10 c.c.s.)
Water	32 ozs. (320 c.c.s.)

Renew this bath frequently as contamination with "sensitizer" lessens its activity.

The tissue is now laid face downwards upon the bromide print, and the two squeegeed into contact. A flat squeegee is used, and particular care taken that the tissue does not move on the surface of the bromide during the early stages of squeegeeing.

Both print and tissue are now lifted from the glass, and placed between greaseproof paper where they are allowed to remain for 15 minutes. During this time a piece of transfer paper, similar to that used in carbon printing and larger in size than the tissue in use, is selected, and placed in a dish of water.

If a thin transfer paper is used, allow it to soak for 5 minutes, while, if thick, 10 minutes will be necessary.

The transfer paper is then laid face upwards upon a sheet of glass, and is ready to receive the carbon tissue.

The bromide print and its adhering tissue should now be taken from between the greaseproof paper, and the two carefully separated by lifting one corner of the print and gently but decisively pulling the two surfaces apart The bromide print should be dropped into a dish of water, and the tissue placed film down upon the transfer paper.

The tissue is then squeegeed to the support transfer paper, and the two placed between blotting paper for from 20 to 40 minutes. The bromide print, after well washing, may be re-developed for future use.

When the tissue and final support have been in contact for the required time they are placed in a deep dish of water at a temperature of 95° to 100° F. In a few minutes the pigmented gelatine begins to dissolve: colour oozes out at the edges of the tissue.

The two papers are now separated by taking a corner of the tissue and gently pulling the two apart under the water. The majority of the pigmented gelatine will now be found upon the transfer paper, and development of the image is proceeded with by pouring warm water over the surface of the print. The image is very tender at this stage, and care should be taken that nothing touches its surface. When development is complete the print is transferred to a 3 per cent. solution of alum, and when all signs of yellowness in the high-lights have disappeared, is washed for a few minutes in water, and then hung up to dry.

GUM-BICHROMATE.

The following (greatly abridged) are working instructions in this now little-used process according to perhaps the most accomplished exponent of it, M. Robert Demachy.

The gum solution is one of ordinary gum arabic of 50 per cent. strength in cold water.

The sensitiser is a saturated solution of potass. bichromate.

To make the sensitive solution 1 part of bichromate solution and 2 parts of gum solution are mixed, and then moist water-colour tube pigment added in sufficient quantity, as ascertained by trial.

The paper is coated by applying the mixture with a flat hog's hair brush, afterwards smoothing the coating with two wide, flat hog's hair brushes.

Exposure under a quick-printing negative ranges from 10 minutes (in the shade on a bright summer day) to much longer.

Prints are developed either by simply soaking in cold or tepid water, by pouring water over the print supported on a glass plate, or by delicate friction with a wet brush or sponge.

THE BROMOIL PROCESS.

In this form of the oil process a bromide print or enlargement is treated so as to bleach the image and at the same time bring the print into a condition similar to that produced by exposure of sensitised paper in the oil process.

The bleach is made from the two following stock solutions :—

A.	Copper chloride	160 grs. (36·5 gms.)
	Sodium chloride (common salt)	2oz. 290 grs. (270 gms.)
	Hydrochloric acid	3 minims (0·6 gm.)
	Water... ...	10 ozs. (1,000 c.c.s.)
B.	Potass. bichromate	55 grs. (12·5 gms.)
	Water	10 ozs. (1,000 c.c.s.)

The bleach is made up by mixing 1 oz. of A, 1 oz. of B, and 2 ozs. of water.

The bromide print is soaked in water for about 5 minutes until limp, drained from surface moisture and placed in the bleacher. Within from 3½ to 4½ minutes the picture is converted into a faint brownish image. When thus fully bleached the print is washed in running water for about 15 minutes to free it from yellow stain and is then fixed in a hypo bath containing 1 oz. of hypo in 20 ozs. of water. It is then again washed for about half an hour.

Before pigmenting the print is soaked in warm water, the temperature of this water requiring to be adjusted to the quality of the bromide paper. Average temperatures are those from 70 to 80° F. (21-27° C.). The print is soaked for a time which may range from 15 to

45 minutes and is then ready for pigmenting.

Separate Bleaching.

Venn Method.

Bromide prints, developed to a Watkin factor of 8 in the maker's amidol developer, used at half strength, are transferred directly after draining to a 10 per cent. hypo solution for 5 minutes. They are then thoroughly washed and dried.

After soaking for 5 minutes, the print is bleached in :—

Copper sulphate (10% soln.)	95 parts
Potass. bromide (10% soln.)	5 parts

After remaining here half a minute after the bleaching appears complete, the print is drained and put directly in :—

Potass. bromide (10% soln.)	4 ozs. (200 c.c.s.)
Potass. bichromate (1% soln.)	2 ozs. (100 c.c.s.)
Water to make...	20 ozs. (1,000 c.c.s.

for four minutes.

After washing for five minutes in several changes of water, it is fixed for two minutes in 10 per cent. hypo, washed for fifteen minutes in one or two changes of water and dried. A temperature of 60-65° F. (15·5-19° C.) should be maintained through these operations.

Before inking up, the dried prints are soaked for times such as the following—Kodak Royal for 45 mins. at 75° F. (24° C.) ; Barnet C. C., for 30 mins. at 65° F. (19° C.) ; Wellington Bromoil, for 30 mins. at 65° F.

THE OIL PROCESS.

Gelatine-coated paper is sensitised with bichromate, printed under the negative, and treated in cold water. The faint image has the power of fixing greasy ink.

SPIRIT SENSITISER (*Demachy*).

Prepare 6 per cent. ammonium bichromate solution by dissolving 1½ ozs. of this salt in 25 ozs. of water.

To make the sensitiser mix at time of use :—

Stock bichromate solution	1 part.
Alcohol, pure 90°	2 parts.

The sensitiser is applied with a flat hog-hair brush, about ¾ oz. serving for six 10 × 8 sheets of transfer paper.

The paper dries in about 18 minutes, and is printed under the negative until it shows a brown image as in the platinum printing process. The detail should show in the high-lights.

It is then soaked in several changes of water to remove the yellow bichromate (about 20 minutes), and then soaked for a further time (in a dish of water), depending on the thickness of the gelatine coating. An average time is 30 minutes ; 2 to 3 hours for more heavily coated papers. The temperature of the water should be between 65° and 70° F.

The print can be pigmented forthwith, or dried for pigmenting later on. If it is dried it requires about an hour's soaking in water at 65° to 70° F. to bring it into the best condition for pigmenting.

PALLADIOTYPE.

In the Palladiotype process, which was introduced some years ago by the Platinotype Company, the stable metal palladium replaces platinum. With the exception that the solutions employed are different from those used for Platinotype the procedure is exactly the same. Palladiotypes afford by cold development rich warm-black prints, free from double tones, or inclination to greenish hue, and closely resemble Platinotype prints.

DEVELOPER.

Sodium citrate		8 ozs. (227 gms.)
Citric acid	...	½ oz. (14 gms.)
Water ...	...	46 ozs. (1,300 c.c.s.)

To be used without dilution at 65° to 70° F. (18° to 21° C).

The prints should be developed as soon after printing as feasible and, at least, one minute allowed for full development. They are then transferred direct to the first clearing bath.

The addition of small quantities of potass. bichromate to the developer gives added contrast without loss of quality. From one grain to 4 grains to 20 ozs. may be used according to the effect desired. Printing should be slightly longer than the normal.

CLEARING BATH.

Stock Solution.

Sodium citrate		6 ozs. (170 gms.)
Citric acid	...	2½ ozs. (70 gms.)
Water ...	...	26 ozs. (740 c.c.s.)

For use mix one part of stock solution with 7 parts of water.

Three baths are required, the times of immersion being not less than 5, 10 and 20 minutes respectively. These periods may be prolonged, within reason, without detriment. The prints are then washed for not less than 20 minutes (in several changes of water) and suspended to dry.

PLATINUM PRINTING.

In the platinum process the paper is coated with a sensitive iron (ferric) salt, and a salt of platinum. On exposure to daylight, or equivalent, the iron salt is reduced to the ferrous state, the change being accompanied by a darkening which enables the depth of printing to be judged. Printing should be continued until all details, except in the highest lights, are visible in the preliminary image.

Development is done by either floating on, or immersing in, a solution the principal ingredient of which is potassium

oxalate. The ferrous salt is soluble in this solution, and in the act of dissolving reduces the platinum salt *in situ* in extent corresponding with the reduction of the ferric salt by light, the permanent picture in finely divided platinum appearing simultaneously. To secure the full beauty of the process, correct exposure and full development are essential. Correctly exposed prints cannot be over-developed; the action automatically ceases when all the ferrous salt has been dissolved. Not less than one minute should be allowed for cold development; with hot solutions a few seconds suffice.

No fixing is required, but to eliminate iron and other salts remaining after development, the prints must first be washed in dilute hydrochloric acid solution. This is the operation known as "clearing." The acid is essential, for if omitted, basic compounds will form and the paper will discolour with age. Accordingly, the prints are transferred direct from the developer to the first clearing bath, in which they should remain for about 5 minutes. They are then removed to a second bath for 10 minutes, and again to a third bath for about 15 minutes.

The clearing solution for "black" prints should contain 1 oz. of pure hydrochloric acid to 60 ozs. of water; for "sepia" papers the quantity of water may be increased to 80 ozs. with advantage.

After clearing, the prints are washed for about 15 minutes (four or five changes of water are sufficient) and suspended to dry. Drying between blotters is a frequent cause of stains.

The following are the developers recommended by the Platinotype Company, the original patentees and manufacturers of the papers. Purity of the chemicals is of the utmost importance. Those supplied by the Company are tested, and can be relied upon.

Cold-Bath Developer.

To be used for all grades of "Black" Platinotype paper at a temperature of 65° to 70° F. (18° to 21° C.)

Stock Solution.

Potass. oxalate...	14 ozs. (400 gms.)
Potass. biphosphate	2 ozs. (56 gms.)
Oxalic acid ...	½ oz. (14 gms.)
Water	96 ozs. (2,700 c.c.s.)

For use dilute with equal bulk of water.

Hot-Bath Developer.

To be used for Sepia Japine Papers only, at temperature 160° to 170° F. (71° to 77° C.)

Formula for Stock Solution as the foregoing, but with water reduced to 80 ozs.

For use dilute with equal bulk of water.

To be used for matt-surface Sepia papers at temperature 160° to 170° F. (71° to 77° C).

Potass. oxalate...	16 ozs. (450 gms.)
Oxalic acid ...	200 grs. (13 gms.)
Water	64 ozs. (1,800 c.c.s.)

To be used without dilution.

During heating and when not in use the hot-bath developers should be kept covered with a sheet of glass, cut only a shade larger than the top of the dish.

IRON PRINTING PROCESSES.

Ferro-Prussiate Sensitiser.

The following is a sensitising solution for paper to be used for printing by daylight and to be kept in good condition for a considerable time (months) :—

A. Ferric ammonia citrate (green)	110 grs. (250 gms.)
Water	1 oz. (1,000 c.c.s.)
B. Potass. ferricyanide ...	40 grs. (90 gms.)
Water	1 oz. (1,000 c.c.s.)

Mix in equal parts, keep in the dark, and filter just before use.

If the ordinary brown citrate be used, the formula should contain 80 grs. (188 gms.), and the ferri-cyanide should be increased to 60 grs. (137 gms.)

The sensitiser is applied with a brush or sponge. The paper is printed until the shadows bronze, and is "developed" simply by soaking in one or two changes of plain water.

The following is a sensitising solution yielding a very much more rapid paper but of inferior keeping qualities, *i.e.*, keeping in condition for about 60 days :—

Ferric ammonium citrate, 26% solution ...	6 parts.
Ferric ammonium oxalate 10% solution ...	2 ,,
Ferric sodium oxalate, 10% solution ...	2 ,,
Ferric chloride, 7% solution	2 ,,
Oxalic acid, 10% solution	2 ,,
Potass. ferricyanide, 10% solution ...	1 part.

Solution for Writing Titles on, removing blue lines from blue prints, etc.—Potass. oxalate, 75 grs. per oz.; 170 gms. per 1,000 c.c.s.

Brightening the Colour.—Blue prints are improved in colour by a final bath of 2½ per cent. alum solution, 3 per cent. oxalic acid, or 1 per cent. hydrochloric acid.

The Kallitype Process.

Paper, sensitised as below, is printed to a semi-visible image, like platinum paper. It yields prints from black to sepia, according to the developer. If prints are fixed in a mixture of hypo and ammonia the results are reasonably permanent.

The sensitiser is made from the following stock solutions with addition of silver nitrate :—

A.—Ferric oxalate (pure and fresh), 20% solution.

B.—Ferric potass. oxalate, 1 : 16 solution.

C.—Potass. bichromate, 1 : 16 solution.

D.—Oxalic-ammonia solution, consisting of :—Oxalic acid, 240 grs.; ammonia, ·880, 100 minims; water, 4 ozs.

Sensitiser.

A ... 1 oz. (28 c.c.s.)	C ... 4 drops.
B ... ½ oz. (14 c.c.s.)	D ... 30 minims. (1·8 c.c.s.)

To the above mixture of A, B, C and D is added silver nitrate cryst., 36 grs. (2·3 gms.)

Paper thus sensitised yields prints of full gradation and half-tone from ordinary negatives, such as print well in P.O.P.

For flat negatives further bichromate solution may be used in the developer.

DEVELOPERS.

For Black Tones.

Borax	2 ozs. (100 gms.)
Rochelle salt ...	1½ ozs. (75 gms.)
Water	20 ozs. (1,000 c.c.s.)
Potass. bichromate sol. (1%)	15-18 drs. (90-115 c.c.s.)

For Purple Tones.

Borax	½ oz. (28 gms.)
Rochelle salt ...	2 oz. (100 gms.)
Water	20 ozs. (1,000 c.c.s.)
Potass. bichromate sol. (1%)	15-18 drs. (90-115 c.c.s.)

For Sepia Tones.

Rochelle salt ...	1 oz. (50 gms.)
Water	20 oz. (1,000 c.c.s.)
Potass. bichromate sol. (1%)	8-10 drs. (50-60 c.c.s.)

Prints are allowed to remain in either of the above developers for from 15 to 30 minutes. They are then fixed for at least 10 minutes.

FIXING SOLUTION.

Hypo	1 oz. (50 gms.)
Ammonia (0·880)	120 minims. (12 c.c.s.)
Water	20 ozs. (1,000 c.c.s.)

Sepia Paper.

This process and the single-solution sensitiser given below may be used for printing from ordinary negatives, but the results are deficient in gradation. Both are excellent for making duplicates of plans, etc., and give a copy in white lines on a brown ground from an ordinary tracing. This copy may be used as a negative for preparing further "positive" copies.

A. Ferric ammonia citrate (green)	110 grs. (250 gms.)
Water	1 oz. (1,000 c.c.s.)
B. Tartaric acid ...	18 grs. (40 gms.)
Water	1 oz. (1,000 c.c.s.)
C. Silver nitrate ...	45 grs. (100 gms.)
Water	1 oz. (1,000 c.c.s.)
D. Gelatine ...	30 grs. (70 gms.)
Water	1 oz. (1,000 c.c.s.)

Equal parts (say 1 oz. of each) of these solutions are mixed as follows:—D is rendered just fluid on a water bath, A and B added, and lastly C, a few drops at a time. Fix in 1 : 50 hypo.

Pellet Process.

The Pellet process is for copies of line drawings only. From an ordinary tracing it gives a copy in blue lines on a white ground.

A. Pure gum arabic	4 ozs. (200 gms.)
Water	20 ozs. (1,000 c.c.s.
B. Ferric ammonia citrate ...	10 ozs. (500 gms.)
Water	20 ozs. (1,000 c.c.s.)
C. Ferric chloride (crystallised)	10 ozs. (500 gms.)
Water	20 ozs. (1,000 c.c.s.)

Add 8 vols. of B, then 5 vols. of C to 20 vols. of A, in small doses with constant stirring.

The prints are developed on 10 per cent. solution of potass. ferrocyanide and "fixed" in

1 : 25 sulphuric acid (specific gravity 1·84).

Ferro-Gallic Process.

This process is for line drawings only. It gives a copy in bluish-black lines on a white ground from an ordinary tracing.

Gum arabic... ...	60 grs. (135 gms.)
Warm water ...	1 oz. (1,000 c.c.s.)

When dissolved add the following in the order given :—

Tartaric acid ...	8 grs. (18 gms.)
Salt	36 grs. (81 gms.)
Ferric sulphate	40 grs. (90 gms.)
Ferric chloride...	60 grs. (135 gms.)

The developer for the prints is :—Alum and gallic acid, 1 part of each ; water 80 parts.

MOUNTANTS.

Starch Paste.

Pure starch is mixed with a very small proportion of cold water to form a very stiff mass. It should be so stiff that it is stirred with difficulty.

Perfectly boiling water is then poured in, about 12 ozs. for every ounce of starch.

On stirring, the mixture will jellify without being boiled ; but if it does not it is brought to the boil, cooled, the skin taken off, and the paste used on day of making.

Dextrine Paste.

Dextrine, best white	2¾ lbs. (1,200 gms.)
Water at 160° F.	64 ozs. (1,720 c.c.s.)
Oil of wintergreen	15 minims (1 c.c.)
Oil of cloves ...	15 minims (1 c.c.)

Place the water in a vessel standing in a larger vessel of water kept to within 1° of 160° F. Stir in the dextrine slowly, and when it has all dissolved add the two preservative oils, stirring all the time. Then allow to cool, pour into bottles, and cork. Put aside in a cool place for a week or two for the mixture to congeal to a firm white smooth paste.

Liquid Gelatine.

Gelatine... ...	1 oz. (100 gms.
Water	6 ozs. (600 c.c.s.)
Chloral hydrate	1 oz. (100 gms.)

The gelatine is dissolved in the water by aid of heat, and the chloral hydrate added. After digesting for a short time the adhesive liquid is neutralised with a little sodium carbonate solution.

Gelatine.

Nelson's No. 1 gelatine	4 ozs. (50 gms.)
Water	16 ozs. (200 c.c.s.

Soften the gelatine in the water, liquify on the water bath, and add a little at a time and stirring rapidly :—

Methylated spirit	5 ozs. (60 c.c.s.)
Glycerine ...	1 oz. (12 c.c.s.)

The mountant is used hot. A piece of ground glass is dipped in hot water, drained, and the mountant brushed over. The print is then laid face up on the pasted surface and rubbed gently in contact with a piece of paper, being then removed and pressed down on its mount.

Starch-Gelatine.

A. Bermuda arrow-root	8 ozs. (200 gms.)
Water	4 ozs. (100 c.c.s.)
B. Nelson's No. 1 soft gelatine	360 grs. (20 gms.)
Water ...	64 ozs. (1,600 c.c.s.)

The gelatine is first softened in the water and A and B are then mixed together and boiled for a few minutes. To the cold mixture are stirred in—

Methylated spirit	5 ozs. (125 c.c.s.)
Carbolic acid (liquid)	25 minims (1·3 c.c.s.)

This is a good cold paste, which sticks and keeps fairly well.

Starch-Dextrine.

Water (cold) ...	5 ozs. (1,000 c.c.s.)
Starch	60 grs. (27 gms.)
Dextrine, best white ...	2 ozs. (400 gms.)
Sodium carbonate, cryst	6 grs. (2·7 gms.)
Oil of cloves ...	8 minims (3 c.c.s.)

The ingredients are well mixed together in the order given, so as to form a milklike fluid quite free from lumps. This is gradually brought to the boil (stirring all the time) and then poured into suitable jars, which it should nearly fill. When cool the surface skin is taken off and the jars well stoppered. In one or two days' time the mixture should have set to a smooth white paste, of excellent keeping quality. The sodium carbonate is required principally to neutralise any residual acid in the dextrine. Less than the quantity indicated may be found sufficient. When set the paste should be either neutral or slightly alkaline to litmus paper.

Shellac Mountant.

A strong solution of shellac in methylated spirit, or better, rectified spirit, is thinly applied to both mount and print, and the two coated surfaces quickly rubbed into contact. A good method of fixing prints to thin mounts in albums, etc.

Fixing Paper to Metal.

Tragacanth ...	3 ozs. (60 gms.)
Gum arabic ...	12 ozs. (240 gms.)
Water	50 ozs. (1,000 c.c.s.)

Mounting on Glass.

Prints on gelatine paper are mounted face down on glass with a weak solution of soft gelatine. Prints mounted in this way were formerly largely sold as "opalines."

Nelson's No. 2 soft gelatine...	2 ozs. (30 gms.)
Water	20 ozs. (300 c.c.s.)

The gelatine is soaked in the water, and liquified by standing the vessel in hot water. The solution is thinned down until nearly as thin as water. Print and glass are immersed, removed together, and squeegeed together with flat rubber squeegee.

WORKING UP, COLOURING, ETC.

Lubricant for Prints.

This lubricant is used when burnishing prints with a steel roller.

Powdered Castile soap	20 grs. (5 gms.)
Alcohol	10 ozs. (1,000 c.c.s.)

Encaustic Paste.

Purified beeswax ...	50 parts
Oil of lavender ...	30 parts
Benzole	30 parts
Gum elemi ...	1 part

BASKETT'S FORMULA.

To the contents of a 2d. tin of Globe polish add 1 oz. best olive oil and 1 oz. terebine. Apply with soft cloth and polish.

For reducing bromide prints use in exactly the same way as for negatives.

Finishing Materials.

Conté Black Stumping Chalk (Velours à Sauce).
Conté Sepia Stumping Chalk (Velours à Sauce).
Conté Powdered Black Lead.
Conté Powdered Charcoal.
Velvet Black or Intense Black Pastel (finest soft).

Prepare the bromide print by first rubbing over with pumice flour with a tuft of wool or flannel in a circular manner, and remove with another piece of wool or duster.

Mix the chosen powder with pumice flour to the tint required and apply with a stump or tortillon. For picking out lights use putty rubber. For sharp lines, use conté crayons in cedar. Special pencils are sold for sulphide-toned prints. If the finish is slight and the powder lightly applied it can be fixed by steaming the print.

GLOSSY BROMIDES.

For invisible finishing on glossy paper apply a few grains of spirit nigrosine black, dissolved in "methylated finish," with a rag or brush. In order to match a print, tone the black with Bismarck Brown.

Preparing for Colouring.

GLOSSY BROMIDE AND P.O.P.

Rub the prints lightly with a tuft of wool slightly moistened with artists' purified ox-gall. If they have been lubricated before burnishing apply previously a little alcohol in the same way.

COLLODION PRINTS.

Fluid extract of quillaia	1 dr. (5 c.c.s.)
Water	1 oz. (40 c.c.s.)
Alcohol	1 oz. (40 c.c.s.)

BROMIDES.

For Water Colouring.

Apply ox-gall as directed for P.O.P., or prepare as directed below for chalk work.

For Oil Colouring.

If the surface is clean no preparation is needed; if otherwise give a wash of gum, starch or gelatine, or prepare with pumice powder. Also light drying oil (from the artists' colourman) may be rubbed over with a tuft of wool or the fingers. It dries in about twenty-four hours.

and leaves the surface of the bromide ready for painting.

Fixative (Crayon and Pastel).

A. Mastic	24 grs. (1·6 gm.)
Amyl acetate ...	3 ozs. (85 c.c.s.)

Dissolve by agitation, and allow to stand for some hours before use.

B. Celluloid ...	7 grs. (0·45 gm.)
Amyl acetate ...	3 ozs. (85 c.c.s.)

Dissolve by agitation. Mix A and B when both are clear, and keep in tightly-corked bottle. Apply with spray diffuser.

Colouring in Oils.

(*Lantern Slides.*)

Canada Balsam thinned with turpentine is a very useful medium for colouring slides in conjunction with transparent oil colours, those indicated * below being suitable.

Spotting Bromide Prints.

Mix together Payne's grey and Indian ink (the colour should match that of the film). For sepia, Indian ink and burnt sienna.

Spotting P.O.P. Prints.

Add a little carmine to the above. When mixture is dry (on the palette) work in a strong solution of gum, rubbing the brush one way only, to avoid making air-bells. If the prints are to be enamelled or glazed by stripping after spotting then artists' oil colours with benzole in which gum dammar has been dissolved, or water colours, may be used with shellac water varnish. (See "Negative Varnishes.")

Crystoleum.

The print (which should be on albumenised paper on account of its thin substance and fine texture) is mounted with a warm solution of :—

Hard gelatine ...	20 grs. (45 gms.)
Water	1 oz. (1,000 c.c.s.)

containing a little salicylic acid to keep it. Or with a cold mountant made by mixing the above with an equal amount of starch paste.

VARNISH FOR "TRANSLUCING."

Canada balsam...	5 ozs. (100 gms.)
Solid paraffin ...	2 ozs. (40 gms.)
White wax ...	2 ozs. (40 gms.)

which is melted, the picture immersed, and the whole kept as cool as possible consistent with remaining fluid.

Artists' Water Colours.

The following are suitable colours for bromide enlargements, platinum, and carbon prints. The colours in ordinary type are permanent; those in italics are more or less doubtful except under special precautions against exposure. Those marked * are transparent.

*Alizarin Scarlet. *Flesh Tint, No. 1.* Flesh Tint, No. 2. Flesh Tint, No. 3.

*Indian Red. *Rose Madder. Venetian Red. Vermilion.

*Antwerp Blue. Cobalt Blue. *French Ultramarine. Indigo.

*Prussian Blue. **Brown Pink.* *Burnt Sienna. Cadmium Yellow.

Chrome Lemon. Chrome Orange. *Indian Yellow. Naples Yellow.

*Raw Sienna. Roman Ochre.

Yellow Ochre. *Emerald Green.* **Hooker's Green, No. 2.* Terre Verte. **Brown Madder. Payne's Grey.*
Raw Umber. Sepia. **Vandyke Brown.* *Ivory Black. Lamp Black. Chinese White.

The above colours are also made specially, in small pots, for air-brush work.

LANTERN SLIDES.

Lantern plates fall into three main groups, viz.:

Rapid (Black-tone).

These require to be handled in the dark room by bright yellow safelight. In general they give black tones. Some varieties, however, allow warm tones to be obtained with ease. Especially suitable for printing by reduction, and when the closest tone reproduction is desired.

For a cold black tone and with a normal, correctly exposed negative, an exposure of about 5 secs. will be required at three feet from a 16 c.p. bulb. Any standard plate developer (*e.g.*, amidol, hydroquinone, metol-hydroquinone, *etc.*) may be used. For warmer tones pyro-ammonia or dilute ortol developers are the most suitable.

Slow (Warm-tone).

Of slower speed, but still preferably used in the dark room. These plates give a rather stronger contrast and are particularly adapted for making slides of warm colour, ranging from brown to red. The exposure requires to be about four times that for a black-tone plate. When warm black, brown or red tones are desired, the exposure is lengthened and development carried out in a caustic soda-hydroquinone developer heavily restrained with bromide, or in a much diluted M.Q. developer, etc.

Gaslight, etc.

Plates of slow speed, for use in ordinary rooms under conditions as for gaslight-paper printing, giving vigorous contrast and allowing of a wide range of warm tones by direct development. Suitable for printing (by contact) negatives which are excessively soft in contrast. At six inches from a 32 c.p. bulb the exposure required to give a normal (cool-black) tone with a correctly exposed negative will be in the neighbourhood of 45 seconds; and with an appropriate M.Q. or amidol developer (as compounded for gaslight paper), development takes only about 30 seconds at 65° F.

When an M.Q. solution containing ammonium bromide and carbonate is employed to obtain warm tones, the exposure is increased up to about five times, development then requiring about 2½ minutes.

In addition to the above, there are a few special varieties, notably the Ilford "Alpha" lantern plate, which gives a very wide range of tones by development and toning.

Pyro-Caustic.

For Rapid Plates.

Soda sulphite cryst	180 grs. (21 gms.)
Ammonium carbonate	60 grs. (7 gms.)
Ammonium bromide	30 grs. (3·5 gms.)
Caustic potash	50 grs. (5·7 gms.)
Water	10 ozs. (500 c.c.s.)

Add, at time of use, either dry or as 10 per cent. solution :—

Pyrogallic acid	30 grs. (3·5 gms.)

Hydroquinone-Rodinal.

For Slow Plates.

Specially recommended by J. W. Shaw for soft, brown-black tones of great richness on warm-tone plates.

A.	Hydroquinone	640 grs. (25 gms.)
	Soda sulphite	8 ozs. (140 gms.)
	Citric acid ...	240 grs. (9·0 gms.)
	Potass. bromide	120 grs. (4·5 gms.)
	Water ...	80 ozs. (1,400 c.c.s.)
B.	Sodium hydrate	640 grs. (25 gms.)
	Water ...	80 ozs. (1,400 c.c.s.)

For use, mix as follows :—

Solution A ...	120 minims (24 c.c.s.)
Solution B ...	120 minims (24 c.c.s.)
Rodinal (concentrated)	5 minims (1 c.c.)
Potass. bromide (10% soln.)	60 minims (12 c.c.s.)
Water	1 oz. (100 c.c.s.)

Development 2-2½ mins. at 60° F. (15·5° C.)

Adurol.

For Slow Plates.

An excellent developer for brown tones, used by J. Dudley Johnston, is as follows :—

A.	Soda sulphite anhydrous	2 ozs. (10 gms.)
	Adurol ...	½ oz. (2·5 gms.)
	Water ...	20 ozs. (100 c.c.s.)
B.	Soda carbonate cryst	4 ozs. (20 gms.)
	Water ...	20 ozs. (100 c.c.s.)
C.	Ammonium bromide	1 oz. (10 gms.)
	Water ...	10 ozs. (100 c.c.s.)
D.	Ammonium carbonate	1 oz. (10 gms.)
	Ammonium bromide	1 oz. (10 gms.)
	Water ...	10 ozs. (100 c.c.s.)

For use take 4 parts of A, 4 parts of B, 2 parts of C, 1 part of D, add 8 parts of water, and use at 70-75° F. (21 to 24° C.).

Metol-Hydroquinone.

For Gaslight Plates.

Brown-tone slides are also given by an M.Q. developer used by Dudley Johnston as follows :—

Metol	50 grs. (1·44 gms.)
Hydroquinone	35 grs. (1 gm.)
Soda sulphite anhydrous	240 grs. (6·9 gms.)
Soda carbonate, anhydrous	240 grs. (6·9 gms.)
Water	20 ozs. (250 c.c.s.)

For use, take 3 parts of the above, add 1 part of ammonium carbonate (10 per cent. soln.), 1 part of ammonium bromide

10 per cent. soln.), add 4 parts of water and use at 75 deg. F. (24° C.).

For fine sepia tones, add 15 minims of 10 per cent. hypo solution per ounce of mixed developer; for cold sepias, double this amount of hypo.

Thiocarbamide.

The thiocarbamide developer for lantern slides is one which yields a wide range of colours by simple development, ranging from magenta red through purple to blue and bluish-grey and on to neutral grey and black. Brown tones even are obtainable. The colours and the quality of the image are very fine. The warmer colours are obtained by greatly increased exposure in conjunction with the necessary modification in the composition of the developer. The method was worked out by Dr. C. E. K. Mees for Messrs. Wratten & Wainwright in 1908.

Stock Solutions.

A. Metol	44 grs. (10 gms.)
Hydroquinone	22 grs. (5 gms.)
Soda sulphite cryst	1 oz. (100 gms.)
Soda carbonate, cryst	1 oz. (100 gms.)
Water to make	20 ozs. (2,000 c.c.s.)
B. Ammonium carbonate ...	1 oz. (50 gms.)
Ammonium bromide	1 oz. (50 gms.)
Water to make	10 ozs. (500 c.c.s.)
C. Thiocarbamide	33 grs. (3 gms.)
Ammonium bromide	11 grs. (1 gm.)
Water to make	10 ozs. (400 c.c.s.)

The chief difficulties in thiocarbamide development are (1) judging the correct density, (2) obtaining the desired colour. It is not difficult to obtain either of these separately, but it is not easy to get both together, as both depend upon the same factor, viz., length of time of development.

The slide passes through a regular sequence of colour changes, beginning with yellow and passing thence to red, purple, blue-grey and ultimately black, although it is impossible to follow these changes with the eye during development. The problem thus becomes one of so adjusting, exposure and developer that the correct density is reached at the same time as the desired colour.

This would appear to be impossible unless the contrast of the negative were just correct for the purpose, and Dr. B. T. J. Glover (B.J., March, 1923) says the negative must be adjusted to that end by reduction or intensification. This is correct for a given temperature, but experience shows that by alterations of temperature a compensating factor can be introduced.

The best way to use this developer is the factorial method, a factor of 6 being about correct for 70° F.; but density is obtained more readily at higher temperatures and the factor will therefore become less as temperature is increased. The developer is extremely sensitive to slight changes of temperature and success depends upon maintaining the developer at an even temperature with the aid of a water bath or other means.

Working developers: For warm-brown tones use A, 14 parts; B, 1 part; C, 1 part. For blue-grey tones, use A, 12 parts; B, 3 parts; C, 1 part, For warm black tones, use A, 10 parts; B, 5 parts, C, 1 part.

Intensifying.

An intensifier which does not modify the tone of a slide is as follows: The slide should first be hardened with alum or formaline.

Stock Solutions.

A. Metol ...	...	88 grs. (10 gms.)
Acetic acid (glacial)		1 oz. (50 c.c.s.)
Citric acid	...	176 grs. (20 gms.)
Water	...	20 ozs. (1,000 c.c.s.)
B. Silver nitrate ...		1 oz. (50 gms.)
Distilled water		20 ozs. (1,000 c.c.s.)

To make the intensifier, mix: A, ½ oz. (24 c.c.s.); B, 10 to 20 minims (1-2 c.c.s.); warm water, ½ oz. (24 c.c.s.), giving a temperature of 75-80° F. (24 to 27° C.).

Mix *immediately* before use, apply to the *dry* slide in a glass dish and pour on and off for not more than 1¼-1½ mins., replacing by fresh if not intensified enough.

The solution produces intense stains, so contact with the hands or clothes must be avoided.

It is important, to avoid stains developing in the slide in course of time, to place the slide, after rinsing, in a clean acid hypo bath for 5 minutes and then wash thoroughly.

Toning.

(1) For a fine brown tone, bleach in mercuric chloride solution (as used for intensification), wash and dry.

(2) Bleach in one of the following solutions, rinse, remove the bichromate stain with weak potass. metabisulphite solution, wash and dry.

A. Potass. bichromate		10 grs. (2·3 gms.)
Hydrochloric acid		5 drops (18 drops)
Water ...	...	1 oz. (100 c.c.s.)
B. Potass. bichromate		10 grs. (2·3 gms.)
Potass. bromide		5 grs. (1·15 gms.)
Nitric acid	...	5 drops 18 drops)
Water ...	...	1 oz. (100 c.c.s.)

C.—Same as above, save that potassium iodide is used in place of bromide.

On exposure to bright daylight, the bleached slide gradually darkens. A slide bleached in A tends to warm brown; one bleached in B becomes cool, grey; and one bleached in C, brown in colour.

Dye-Toning.

Basic dyes may be used in the preparation of lantern slides in colour by treating the finished positive in the following mordanting bath (Eastman Kodak formula):—

Uranium nitrate		14·6 grs. (1·6 gms.)
Oxalic acid	...	7·3 grs. (0·8 gm.)
Potass. ferricyanide		7·3 grs. (0·8 gm.)
Water to make ...		20 ozs. (1,000 c.c.s.)

The immersion should not be prolonged beyond the first perceptible turn towards brownness in tone, which with a new bath will appear in 1½-2 mins.

Wash until free from stain (10-15 mins.) and dye by immersion in a dye solution of :—

Dye	3·65 grs. (0·2 gm.)
Acetic acid, glacial	10 minims (0·5 c.c.)
Water to make...	40 ozs. (1,000 c.c.s.)

Suitable dyes are chrysoidine (brown), auramine (yellow), malachite green, victoria blue and methyl violet (the latter used in half the amount quoted).

Masking.

Prepare strips of black "needle" paper 3¼ ins. long and of various widths from ¾ in. to 1 in.

One edge at least must be perfectly clean cut.

Lay the slide, film side up, on white paper, moisten the surface of a suitable strip with the tongue and affix it on the slide so as to mask off to the desired margin.

A sheet of ruled paper laid under the slide helps in placing the strips squarely.

Apply other strips to the remaining three slides and trim off projecting edges with scissors.

Finally affix a white spot or disc on the two upper corners and proceed to the binding.

Binding.

Select a brand of binding strips of thin, tough paper, coated with strong adhesive, and use the strips in one full length (13¼ ins.).

Lay the strip out, gummed side down and moisten the back.

When the strip is limp, turn it over, just moisten the gummed side and lay the strip, face up, on a yielding surface, *e.g.*, two thicknesses of blotting paper.

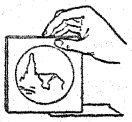


Fig. 1.

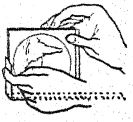


Fig. 2.

Cover the slide with a thin and carefully cleaned coverglass, place one corner on the gummed strip (Fig. 1) and press it firmly down.

Turn the slide over on edge (Fig. 2) and over again (Fig. 3).



Fig. 3.

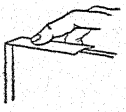


Fig. 4.

At each movement press the slide firmly down on the strip and run the finger *along the edge only* of the strip, to cause it to adhere to the slide (Fig. 4).

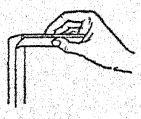


Fig. 5.

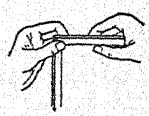


Fig. 6.



Fig. 7.



Fig. 8.

Now press the sides of the strip firmly against the glass, pushing the top end of the

upright strip away from the glass (Fig. 5).

Then press down the corner to make a neat join (Fig. 6). Then turn the slide over once more into position (Fig. 7) and repeat operations 5 and 6.

Again turn, so as to join the ends of the binder, and repeat 5 and 6.

The slide completely bound in this way is seen in Fig. 8.

Always rub the edge of the binder firmly down before pressing down the sides.

COLOUR PHOTOGRAPHY.

The following are the official working instructions for the screen plates on the market at the time of sending this portion of the ALMANAC to press (Nov. 15, 1928) :—

The Autochrome Plate.

As a guide to exposure an average outdoor subject in midday summer sunshine requires about 1 sec. at *f*/8.

Two solutions only are used—developer (used also for redevelopment) and reversing solution. There is no need to fix.

In making the developer stock solution, dissolve the Quinomet in warm water (about 100° F.), add the sulphite, and then, when cold, the ammonia.

Working developer: Stock solution, 1 part; water, 4 parts.

Developer—Stock Solution.

A.	Water, distilled	35 ozs. (1,000 c.c.s.)
	Metoquinone ... (Quinomet)	½ oz. (15 gms.)
	Soda sulphite, anhydrous	3½ ozs. (100 gms.)
	Liquor ammonia, ·920	9 drs. (32 c.c.s.)
	Potass. bromide	240 grs. (16 gms.)

For half-plate, place in developing dish the following solution :—

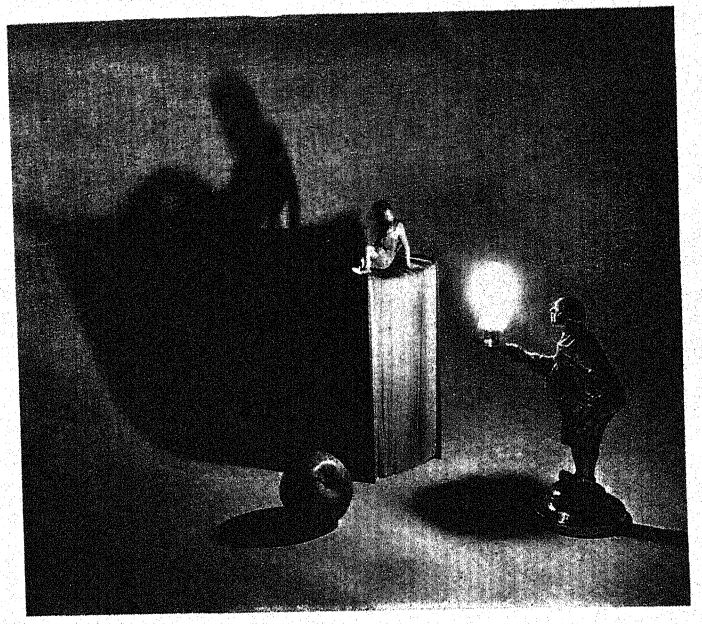
Stock solution A above		1 oz. (20 c.c.s.)
Water	... ...	4 ozs. (80 c.c.s.)

Place the plate therein, and count the number of seconds from the moment of entering until the appearance of the first outlines of the image (the sky should not be taken into consideration). As soon as the outlines appear, note the number of seconds, multiply it by 10 and you will get the total duration of development. Thus, if the first outlines come out after 20 seconds, development will be completed in 200 seconds.

The development must begin out of reach of the light of the lantern which should be fitted with Virida paper; but after 10 or 12 seconds, the plate may be rapidly examined.

Reversal of the Image.

Following the development and after a short washing in running water, immerse the plate in a dish containing 3 ozs. of the reversing solution and take the dish out in full light. The plate which was opaque, clears, and the colours become more and more visible by transmitted light. After half or one-and-a-half minutes, when the plate is thoroughly clear and bears no more trace of negative



THE TEMPTATION — OLAF CHRISTOFFERSEN



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image, take it out of the dish and wash it for about 30 seconds in running water.

In very warm weather, don't leave the plate too long in this reversing bath, as this might cause the coating to leave the plate in spots during the second development and final washing.

REVERSING SOLUTION.

C. Potassium permanganate	30 grs. (2 gms.)
Sulphuric acid	3 drams (10 c.c.s.)
Water... ...	35 ozs. (1,000 c.c.s.)

This solution will keep for a short time, but should not be used if cloudy.

Immediately the plate is covered by the C solution daylight may be used.

Second Development.—The plate is then re-developed in full daylight, using the solution which has served for the first development (kept in the dish without special precautions). When the high-lights are completely darkened (about 3 or 4 minutes) the plate is washed for 3 or 4 minutes, and immediately placed to dry. Fixing is unnecessary unless the plate is intensified.

Hyper-sensitising.

(*Unofficial.*)

The plates are immersed for 10-12 minutes at a temperature not above 60° F. (15·5° C) in the following solution :—

Pantochrome alcohol sol'n (1 : 2000) ...	½ oz. (3 c.c.s.)
Ammonia nitrate of silver solution	80 minims (1 c.c.)
Water	25 ozs. (150 c.c.s.)

The Pantochrome solution is prepared by grinding the dye in a mortar with the required amount of alcohol at 120-140° F. (85-95° C). It should be stored in a darkened bottle.

The ammonio-silver compound is prepared (in yellow light) by dissolving 1 gm. of silver nitrate in 20 c.c.s. of water and adding 30 c.c.s. of strong ammonia; the solution should be kept in absolute darkness.

The sensitised plates are washed for 2 minutes and are preferably then immersed for at most 2 minutes in a mixture of 1 part industrial alcohol and 2 parts of water. They are then dried on a draining rack, placed in a light-tight iron box containing an ample supply of calcium chloride.

For the making of the solutions rain water or tap water is used, unless distilled water of high purity is obtainable.

Absolute darkness is essential from the moment of immersion of the plate in the hyper-sensitising solution.

In exposing, an aesculine filter (2 gms. per sq. metre area) is employed. Plates so treated may be given exposures of $\frac{1}{12}$—$\frac{1}{15}$ normal and display a longer scale of gradation.

The Agfa Plate.

As a guide to exposure the plate may be given 60 times the exposure required by an extra-rapid ordinary plate of speed about 250 H. & D.

The plate is developed for 3 minutes at 65° F. (18° C.) in a developer made by mixing 1 part of the following stock solution A with 3 parts of water.

Stock Solution A.

Water, warm ...	20 ozs. (1,000 c.c.s.)
Metol	114 grs. (13 gms.)
Hydroquinone ...	35 grs. (4 gms.)
Soda sulphite, cryst	4 ozs. (200 gms.)
Potass. bromide	48 grs. (5·5 gms.)
Ammonia, 0·91 sp. gr. ...	4¾ drams (30 c.c.s.)

In making this stock solution, the water should be at 86 to 95° F., and the chemicals must must be dissolved in the order given. When all are dissolved, cool the solution to the temperature of the room before adding ammonia.

The working developer is used for the re-development, but must not be used again. The temperature of the working developer must not be higher than 65° F. If it is too warm, it is liable to cause softening and frilling of the film. With correct exposure, development is complete in 3 minutes.

Development having been completed, the plate is rinsed for about one minute (not longer) in running water, not under the tap. It is then put in the reversing bath.

Stock Solution for Reversing Bath.

Potass. bichromate	1 oz. (50 gms.)
Sulphuric acid, strong ...	2 ozs. (100 c.c.s.)
Water	20 ozs. (1,000 c.c.s.)

One part of this stock solution is mixed with 10 parts of water to firm the reversing bath, which must not be warmer than 65° F. After one minute in this bath, the light may be turned on, and as soon as it is seen, by transmitted light, that the black silver image has been removed, the plate is taken out and at once put to wash for about one minute in running water. It is then re-developed in the same developing solution as used in the first instance, and is then well rinsed and put aside dry.

Desensitising.

Plates can be developed by bright red light if first immersed in the dark or by a safelight for 5 secs. in stock solution A, 20 parts; distilled water, 52 parts; pinacryptol, 1:10,000 solution, 8 parts. Development is then continued in this same solution.

Duplex Process.

In this process, which is on the lines of the former Joly and Paget processes, a black-and-white negative is made in the camera on a panchromatic plate placed behind and in contact with a mosaic colour screen.

From the negative a positive transparency is printed by contact. The colour transparency is obtained by binding it in register with a mosaic colour viewing screen.

Speed numbers for the plate with the taking screen and compensating filter in position are as follows: H. & D., 125; Wynne, 45; Watkins, 16; Burroughs Wellcome, ½.

On a bright sunny day a fully exposed negative may be obtained with an exposure of 1-20th second, using a lens of $f/4·5$. relative aperture.



EXPOSURE.

For exposure in all latitudes on roll-film.

The following tables, based on those of Burton, give a rough idea of the exposures for various subjects and diaphragms under the following conditions :—

1. Best lighting, such as mid-day sunshine in May, June and July. in Northern Europe.
2. With sensitive material of the speed of average roll-film.

TABLE I.

F/ No.	Average Subject with objects in Foreground. Outdoor Figure Studies.	Landscapes with Light Foreground, Lake, River, and Beach Scenes.	Sea Clouds and Sky.	Subjects with Extra Heavy Foreground, *e.g.*, Dark Trees, Doorways, Groups.	Under Trees, Woods, Avenues, Glades, etc.	Portrait in Average Well-lighted Room.
f/2·7	1/500	1/1000	—	1/240	1/40	1/20
f/3·5	1/350	1/600	—	1/160	1/25	1/12
f/4	1/240	1/500	—	1/120	1/20	1/10
f/4·5	1/200	1/400	—	1/100	1/15	1/8
f/5·6	1/120	1/250	—	1/60	1/10	1/5
f/6·3	1/100	1/200	—	1/50	1/8	1/4
f/8	1/60	1/120	1/500	1/30	1/5	1/2
f/11	1/30	1/60	1/300	1/15	1/2	1
f/16	1/15	1/30	1/150	1/8	1	2

For *full* exposures on the most rapid dry plates, from one-half to one-third the times in Table I. may be taken as a fair indication.

The exposures come between the full times which could be given with advantage (say nearly double those in the table), and the minimum exposures required for a printable negative. The hand-camera user should not reduce them beyond a half, otherwise he will be undesirably near to getting negatives unprintable from under-exposure.

In weather other than bright sunshine the above exposures are multiplied as follows :—

Bright diffused light, the sun behind a cloud ...	× 1½	Heavy clouds over the whole sky. Absence of distinct shadows ...	× 3
Light clouds over the whole sky, but light able to cast a visible shadow	× 2	Very dull. Whole sky covered by still heavier clouds	× 4 to 5

TABLE II.

Daily Variation in Light for different Latitudes.

At other hours of the day and times of the year the above exposures are multiplied by the numbers in Table II. of daylight variation. The figure 1 in Table II. indicates times for which Table I suffices by itself. Table II. has been worked out for the ALMANAC by R. de B. Adamson, B.Sc., of Timaru, N.Z.

Latitude.	North Hemisphere.	MORNING. 12	11	10	9	8	7	6	5	4	South Hemisphere.
60°	June ...	1	1	1	1½	1½	2	3	4	8	December.
	May, July	1	1	1½	1½	1½	2	3	6	10	Jan., Nov.
	April, Aug.	1½	1½	1½	1½	2	3	6	—	—	Feb., Oct.
	Mar., Sept.	1½	1½	2	2	3	6	—	—	—	Mar., Sept.
	Feb., Oct.	3	3	3	6	—	—	—	—	—	April, Aug.
	Jan., Nov.	4	6	8	—	—	—	—	—	—	May, July.
	December.	6	8	—	—	—	—	—	—	—	June.
55°	June	1	1	1	1	1½	2	3	4	—	December.
	May, July	1	1	1	1½	1½	2	3	6	—	Jan., Nov.
	April, Aug.	1	1½	1½	1½	2	3	6	—	—	Feb., Oct.
	Mar., Sept.	1½	1½	1½	2	3	6	—	—	—	Mar., Sept.
	Feb., Oct.	2	2	3	4	8	—	—	—	—	April, Aug.
	Jan., Nov.	3	3	4	8	—	—	—	—	—	May, July.
	December	4	4	6	—	—	—	—	—	—	June.
50°	June	1	1	1	1	1½	2	3	6	—	December.
	May, July	1	1	1	1½	1½	2	3	8	—	Jan., Nov.
	April, Aug.	1	1	1½	1½	2	3	6	—	—	Feb., Oct.
	Mar., Sept.	1½	1½	1½	1½	3	6	—	—	—	Mar., Sept.
	Feb., Oct.	2	2	2	3	6	—	—	—	—	April, Aug.
	Jan., Nov.	3	3	3	6	—	—	—	—	—	May, July.
	December	3	4	6	—	—	—	—	—	—	June.
40°	June	¾	¾	1	1	1½	2	3	—	—	December.
	May, July	¾	1	1	1	1½	2	4	—	—	Jan., Nov.
	April, Aug.	1	1	1	1½	1½	3	6	—	—	Feb., Oct.
	Mar., Sept.	1	1	1½	1½	2	4	—	—	—	Mar., Sept.
	Feb., Oct.	1½	1½	1½	2	4	—	—	—	—	April, Aug.
	Jan., Nov.	1½	2	2	3	6	—	—	—	—	May, July.
	December	2	2	3	4	8	—	—	—	—	June.
		12	1	2	3	4	5	6	7	8	
		AFTERNOON.									

TABLE II. (*continued.*)

Latitude.	North Hemisphere.	Morning. 12	11	10	9	8	7	6	5	4	South Hemisphere.
30°	June	¾	¾	1	1	1½	2	4	—	—	December.
	May, July	¾	¾	1	1	1½	2	6	—	—	Jan., Nov.
	April, Aug.	¾	1	1	1½	1½	3	8	—	—	Feb., Oct.
	Mar., Sept.	1	1	1	1½	2	4	—	—	—	Mar., Sept.
	Feb., Oct.	1	1	1½	1½	3	6	—	—	—	April, Aug.
	Jan., Nov.	1½	1½	1½	2	4	—	—	—	—	May, July.
	December	1½	1½	1½	2	4	—	—	—	—	June.
15°	June	¾	¾	1	1	1½	3	8	—	—	December.
	May, July	¾	¾	1	1	1½	3	—	—	—	Jan., Nov.
	April, Aug.	¾	¾	1	1	1½	3	—	—	—	Feb., Oct.
	Mar., Sept.	¾	¾	1	1½	1½	3	—	—	—	Mar., Sept.
	Feb., Oct.	1	1	1	1½	2	4	—	—	—	April, Aug.
	Jan., Nov.	1	1	1½	1½	2	6	—	—	—	May, July.
	December	1	1	1½	1½	3	6	—	—	—	June.
0°	May, June, July, Nov., Dec., Jan.	¾	1	1	1½	2	4	—	—	—	May, June, July, Nov., Dec., Jan.
	Other months	¾	¾	1	1	1½	3	—	—	—	Other months
		12	1	2	3	4	5	6	7	8	
		Afternoon.									

All the above factors are for atmospheric conditions as on a clear day in England. Extreme N. of Scotland, Lat. 60°; S. of Scotland, N. of England, N. of Ireland, Lat. 55°; S. of England, S. of Ireland, Lat. 50°.

Pinhole Exposures.

(Watkins-Power Numbers.)

W.P. No.	Diameter. Inch.	Inch.	Nearest Needle Size.	Good Working Distance. Inches.
1	0·160	7/64	—	—
2	0·080	1/13	—	—
3	0·053	1/19	1	40
4	0·040	1/25	4	20
5	0·032	1/31	5	14
6	0·027	1/38	7	10
7	0·023	1/44	8	8
8	0·020	1/52	10	5

Rule for use of W.P. No. in Column 1.—Multiply W.P. No. of aperture by its working distance from plate. Use the result as the f/No. in calculating exposure by meter, tables or other means. Whatever the calculated result is in seconds or fractions of a second, expose that number of minutes or fractions of a minute. Example —W.P. 6 at 8 inches—calculate as f/48.

Shutter Speeds for Moving Objects.

From the "Wellcome Exposure Record and Diary."

The formula and table given below indicate the shutter speeds necessary to secure negatives sufficiently sharp for direct printing. For enlarging it is better to give ½ to ⅓ these exposures, or to work further from the object. *The figures are no guide to what is the correct exposure for the plate.*

If D = distance of object in feet, F = focal length of lens, S = speed of object in feet per second, and E = exposure for an object moving across the field of view, then

$$E = \frac{D}{100\ F \times S}$$

The following table gives in round figures the shutter speeds necessary for various moving objects, using the ordinary quarter plate lens of about 5 in. focus. The column A is for objects moving directly towards the operator, B for objects moving obliquely towards or from the camera, that marked C for objects moving directly across the field of view.

Distance of Object, 25 ft., unless otherwise stated.	A.	B.	C.
Street groups (no rapid motion) ...	1/5 to 1/10		
Pedestrians (two miles per hour) } Animals grazing ... ... }	1/20	1/40	1/60
Pedestrians (three miles per hour) ...	1/30	1/60	1/90
Pedestrians (four miles per hour) ...	1/40	1/80	1/120
Vehicles (six miles per hour) ...	1/60	1/120	1/180
Vehicles (eight miles per hour) ...	1/80	1/150	1/250
Cyclists and trotting horses	1/160	1/300	1/500
Foot races and sports...	1/240	1/500	1/700
Divers	—	1/600	1/800
Cycle races, horse galloping	1/300	1/750	1/900
Yachts (10 knots per hour) at 50 ft.	1/60	1/120	1/180
Steamers (20 knots per hour) at 50 ft.	1/120	1/240	1/360
Trains (30 miles per hour) at 50 ft. ...	1/150	1/300	1/450
Trains (60 miles per hour) at 50 ft. ...	1/300	1/600	1/900

At 50 ft. the exposure may be double that at 25 ft.

At 100 ft. the exposure may be double that at 50 ft.

CHEMICALS.

Properties of Chief Chemicals Used in Photography.

On these pages are given particulars of just those chemicals which are used in everyday photography, with those of a few others not so regularly employed. The facts here collected are those which it is useful to know for the proper making-up of solutions: and they also enable photographers unacquainted with chemistry to identify chemicals by their different names.

Acetic Acid ($C_2 H_4 O_2$).—Sold as "glacial," which is the strength to be used in formulæ unless otherwise directed. The glacial acid is a liquid of sp. gr. 1.055, which strongly blisters the skin. At 50 deg. F. it solidifies to a mass of crystals. Thus in cold weather it may be necessary to melt the contents of a bottle of the acid before use by standing the bottle in warm water. Glacial acid absorbs water strongly from the air and must be kept well stoppered. It mixes in all proportions with water, alcohol, ether, chloroform and glycerine, and dissolves gelatine, celluloid, fat, oils, etc. In United States a No. 8 acid of 1·040 sp. gr. is commonly prescribed in formulæ, it is of 31 per cent. strength, *i.e.*, about one-third the strength of the glacial acid.

Albumen.—One of the protein colloid substances which largely compose living tissue, animal and vegetable. Contains nitrogen, sulphur, oxygen, carbon and hydrogen. The typical albumen occurs in white of egg, which is the only animal albumen having any photographic use. Egg albumen is soluble in water and dilute solutions of alkalies and salts. Heated to about 163° F. it is irreversibly coagulated, becoming then amorphous and insoluble. The same effect is produced by strong alcohol, and by most metallic salts. The solution of egg-albumen is extremely liable to decompose and, if not used at once, requires to be preserved with an antiseptic. Invert albumen, which is soluble in alcohol, is prepared from egg albumen by treating first with acid and then alkali. Its use is now limited to process work, owing to the disuse of albumenised paper and of the albumen processes.

Alcohol.—Ordinary alcohol is ethyl alcohol ($C_2 H_5 OH$) which, when of sp. gr. 0·794, is "absolute alcohol" (=100 per cent.). Alcohol containing 10 per cent. water is "rectified spirit." Methylated spirit consists of rectified spirit plus 10 per cent. crude wood spirit (to render it undrinkable) and one-eighth per cent. mineral naphtha. The naphtha appears as a milkiness when the spirit is mixed with water. Methylated spirit which has taken up water, *e.g.*, from wet negatives or prints, can be largely dried by shaking with dry potassium carbonate. The latter takes up the water

which forms a dense solution of it. The partially dried spirit, which takes up about 0·1 per cent. of the potass carbonate, can afterwards be poured off.

Alum.—Double sulphate of aluminium and potassium (or ammonium), *i.e.* potash alum or ammonia alum [$Al_2(SO_4)_3 K_2 SO_4 \cdot 24H_2O$ or $Al_2(SO_4)_3 \cdot (NH_4)_2 SO_4 \, 24H_2O$]. Potash alum is made in large white crystals, but is more conveniently dissolved if bought in powder form. One part will dissolve in ten parts of cold water; in very much less hot water, which therefore should be used when making a stock solution. Ammonia alum is not quite so soluble. Both alums dissolve in glycerine. Both are acid substances, decomposing hypo, with deposition of sulphur. Alum for photographic use should be free from iron, the presence of traces of which is liable to give rise to bluish stains in sulphide-toned prints which have been hardened in a bath containing such impure alum.

Amidol, i.e., diamidophenol hydrochloride of $C_6 H_3 OH (NH_2)_2$. Fine white or bluish grey crystals, very soluble in water, but almost insoluble in alcohol. The solution is acid; addition of soda carbonate produces effervescence. Amidol in the dry state is slowly affected by air and light and should be kept in well stoppered yellow bottles. The solution (with sulphite) for development keeps only a short time, *i.e.*, should be used on the day it is made.

Ammonia, i.e., liquor ammonia, strong solution in water of the gas NH_3. Ammonia is sold as of sp. gr. 0·880, *i.e.*, strongest liquor ammonia, but is often of somewhat less strength. The strong solution rapidly loses strength by exposure to the air. When purchasing a few ounces, it is well to mix with an equal bulk of water, using a double quantity of this half strength mixture in making up any formulæ. Full or half strength ammonia solutions should be kept in a cool place.

Ammonium bichromate $(NH_4)_2 Cr_2O_7$.—Orange crystals, formed by neutralising chromic acid with ammonia. More soluble than the potash salt, one part dissolving in four parts of cold water; far more soluble in warm water, and fairly soluble in absolute alcohol. It can replace potass bichromate in the sensitising of gelatine in the carbon, carbro, and oil processes, and is frequently used in preference on account of its stronger action. It is also largely used for sensitising in photo-mechanical process work, particularly in the making of half-tone images on zinc and copper by sensitised fish-glue.

Ammonium bromide, i.e., bromide of ammonia, NH_4Br. White crystalline powder dissolving in $1\frac{1}{2}$ times its weight of cold water; slightly soluble in alcohol. It becomes moist by exposure to the air and should be kept well stoppered.

Ammonium carbonate, i.e., carbonate of ammonia, rock ammonia. A mixture of ammonium bicarbonate and ammonium carbamate, sold in hard opaque pieces, smelling strongly of ammonia. Any white powdery crust on the pieces should be scraped off before using. Dissolves in about four times its weight of cold water; should not be dissolved in hot water.

Ammonium chloride, NH_4Cl. A commercial quality is the sal ammoniac sold for batteries. One part dissolves in three parts of cold water; in 1½ parts hot water.

Ammonium persulphate, $(NH_4)_2S_2O_8$. Small white crystals, dissolving in 1½ times their weight of cold water. Decomposed by hot water. Persulphate greedily absorbs moisture from the air and must be kept in a well stoppered bottle.

Ammonium sulphide—Sold as deep yellow liquid smelling strongly of rotten eggs. Contains traces of other sulpho compounds with the ammonium sulphide $(NH_4)_2S$.

Ammonium sulphocyanide, i.e., ammonium thiocyanate, sometimes called ammonium sulphocyanate, NH_4CNS. Small white crystals which absorb moisture with great avidity, becoming wet if not well stoppered. Sulphocyanide, which has deteriorated in this manner, should be thrown away; it cannot be dried by heat. The crystals are exceedingly soluble in water and in alcohol.

Borax, i.e., borate of soda, $Na_2B_4O_7 \cdot 10H_2O$. Pure white crystalline powder, one part of which dissolves in 12½ parts of cold water—but very much more readily in hot water. Solutions of borax in water are slightly alkaline.

Bromine, heavy deep red and intensely corrosive liquid, emitting dense orange fumes, extremely irritating to the eyes. It is the element Br, analogous to iodine. Bromine dissolves in about 30 times its weight of water, forming an orange red solution, which also gives off irritating fumes. In any use of bromine it is best to buy it as this "bromine water." Further diluted, this latter forms an excellent bleach for sulphide toning.

Calcium chloride, $CaCl_2$. — The commercial fused form of this substance is the most active absorbent of moisture, for which purpose, in admixture with asbestos, it is used for preserving platinotype paper in a dry condition. An ample supply of the dried chloride can be used with advantage in containers (preferably metal boxes) of sensitive papers or plates. The lumps of chloride may be put in a holder of perforated zinc, of size sufficient for several pounds. When it becomes visibly damp, the chloride can be restored to its original condition by heating it in an iron shovel over the fire.

Caustic potash, i.e., potass hydrate, potass hydroxide, K H O. The "strongest" form of alkali, having a powerful corrosive action on the skin. It is usually sold in sticks which quickly become moist to the touch by absorbing water from the air and also in time become encrusted with a powdery deposit due to the formation of carbonate by absorption of carbon dioxide. Caustic potash must be kept in a well corked bottle, not glass stoppered, since the potash acts on the glass and causes the stopper to stick. For the same reason solutions of caustic potash should be rubber-stoppered. A purer form of caustic potash, very suitable for photographic use, is that known as "by alcohol"; the potash is in pieces of fibrous structure. Caustic potash dissolves readily in half its weight of cold water with production of much heat.

A solution quickly cleans greasy bottles; it softens gelatine, a weak hot bath being used for the wholesale removal of the films from waste negatives.

Caustic soda, i.e., sodium hydrate, sodium hydroxide, NaHO. Except that it is a somewhat less "powerful" alkali and is not so readily soluble in water, caustic soda is similar to caustic potash. It is supplied in the same two forms, stick and "by alcohol" and calls for the same precautions in keeping it in the solid state and in solution.

Chrome alum, double sulphate of chromium and potassium, $Cr_2\ K_2\ (SO_4)_4\ 24H_2\ O$. Violet crystals which are ruby red by transmitted light. Dissolves in about six times its weight of cold water. Hot water should not be used for dissolving it. Chrome alum toughens gelatine somewhat more energetically than do the ordinary white alums, and its tanning action is further increased by addition of a few drops of ammonia, sufficient to render the solution slightly alkaline.

Citric acid, small colourless crystals which have the formula $C_6\ H_8\ O_7\ \cdot H_2\ O$. Extremely soluble in water; slightly soluble in alcohol. Solutions of citric acid in plain water gradually spoil through growth of a mould. This can be prevented by addition of a few drops of carbolic acid.

Copper sulphate, sulphate of copper, blue vitriol, $CuSO_4 \cdot 5H_2\ O$. Blue crystals which dissolve in 2½ times their weight of cold water; half their weight of hot water; insoluble in alcohol. For its chief photographic use, namely copper toning, the pure sulphate should be used; commercial sulphate often contains iron. Should be kept well corked to prevent formation of a bluish-green incrustation.

Dextrine, fine powder, which for use as a mountant, should be the pure white quality; the yellow is less suitable. Simply dissolved in a little water, dextrine forms a highly adhesive syrup but is best prepared by heating it with about 1½ times its weight of water to 160 deg. F. and setting it aside in a cool place for the mixture to congeal to a firm smooth paste.

Ferric ammonium citrate, double citrate of iron and ammonia. It is obtainable in two forms — (1) brown scales, from any chemist, and (2) fine green crystals from large dealers in chemicals. The green citrate is much more sensitive to light than the brown and is now almost always used in the preparation of sensitive iron-printing papers.

Ferrous oxalate, the active substance $FeC_2O_4\ 2H_2O$ of the ferrous oxalate developer. It is itself almost insoluble in water, but is freely soluble in solution of potass oxalate. It is thus formed in solution by mixing solutions of ferrous sulphate and potass oxalate.

Ferrous sulphate, sulphate of iron, proto-sulphate of iron, green vitriol, $FeSO_4 \cdot 7H_2O$. Should be in clear emerald green crystals, free from reddish markings. Slowly oxidises in the air and must be kept well stoppered. One part dissolves in about 1½ parts of cold water, forming a green solution which also gradually oxidises, becoming more yellowish in tint and slightly turbid. This change can be prevented by making the

solution acid with a little sulphuric or tartaric acid, and by keeping a few pieces of iron wire in the mixture. Also the solutions keep better in bright light.

Formaline, 40 per cent. solution of formaldehyde, C H_2 O. The solution has a characteristic penetrating odour, causing the eyes to water. It mixes with water in all proportions and is slightly acid.

Gelatine is not a definite chemical compound, but a mixture of colloid substances. It swells in cold water, dissolves when the swollen mass is heated and sets to a jelly on cooling. A solution of gelatine may be sufficiently weak to be fluid when cold; on addition of alcohol the gelatine is thrown out of solution. Gelatine is dissolved in the cold by oxalic, hydrochloric, acetic and nitric acids. The mixture with the last named forms a liquid glue; that with acetic acid is used as a cement for celluloid. Barium chloride and chloral hydrate also dissolve gelatine in the cold. Alum, formaline and tannic acid harden gelatine, *i.e.*, render it insoluble in, and unswollen by, water.

Glycerine, colourless syrupy liquid, C_3 H_5 $(OH)_3$, of sp. gr. 1·265. It mixes with water or alcohol in all proportions, 100 parts of glycerine dissolve—lead acetate, 20 parts; alum, 15 parts; borax, 60 parts; potass bromide, 25 parts; soda carbonate, 98 parts; potass iodide, 40 parts. Glycerine is entirely non-volatile at the ordinary temperature, that is does not "dry up." A solution of it in water is therefore used as a bath for rendering supple the gelatine coating on papers or film after drying; the water of the bath evaporates, leaving a small quantity of glycerine in the emulsion coating.

Glycin, para-oxy-phenyl-amido-acetic acid. It is a white powder of minute thin plates, very slightly soluble in water but readily soluble in alkaline solutions. Almost insoluble in alcohol.

Gold chloride.—The yellow crystals commonly sold in Great Britain are a compound of gold chloride and sodium chloride of the formula $NaAuCl_4 \cdot 2H_2O$. Each 15 grs. thus contains $7\frac{1}{2}$ grs. of gold metal. Another commercial form of gold chloride is the brown crystals of formula $H\,Au\,Cl_4 \cdot 3H_2\,O$, likewise containing half their weight of gold metal.

Hydrochloric acid, i.e., muriatic acid, a solution in water of the gas HCl. The pure commercial acid has sp. gr. of 1·16 and is a strongly fuming corrosive liquid, which acts chemically and dissolves the oxides and carbonates of most of the metals. "Spirits of salt" is a crude form of hydrochloric acid, containing iron, etc., and is a powerful cleanser of glass vessels containing mineral deposits.

Hydrofluoric acid, strongly fuming and highly corrosive solution of hydrofluoric acid gas, HF. Commercially the acid is sold of strengths 40 per cent. and 55 per cent. It must be kept in gutta-percha bottles, as it attacks glass and thus is used for detaching the gelatine film from glass negatives. All contact of even a weak solution of the acid with the fingers must be avoided.

Hydroquinone, i.e., quinol, hydrokinone, hydrochinon, dihydroxy-benzene, C_6 H_4 $(OH)_2$.

Fine white needle crystals, dissolving in about 18 parts of water, in two parts of 90 per cent. alcohol, or in 6 parts of acetone. Hydroquinone, if pure, should dissolve completely in ether.

Hypo, hyposulphite of soda, sodium thiosulphate, $Na_2S_2O_3 \cdot 5H_2O$. Obtainable as small pea crystals or as much larger crystals of hexagon shape. The latter, though cheaper, are a more active form of hypo. Extremely soluble in water, which dissolves nearly twice its weight of hypo. The solution becomes thereby chilled, so that it is better to use warm or hot water in dissolving hypo. Most acids and acid salts decompose hypo, giving rise to sulphurous acid (odour of burning sulphur) and to a yellowish deposit of sulphur in the solution. Sulphurous acid and its acid salts have not this effect on hypo. In photography hypo is used as a chemical solvent of the silver bromide or silver chloride in the emulsions of plates or papers. It is a much less active solvent of silver iodide. Hypo is also obtainable in the dry or anhydrous form, *i.e.*, without the 5 molecules of water of crystallisation. The dry variety is a white powder, which dissolves in water much more rapidly than the crystals. In fixing, 3 parts of the dry are equivalent to about 5 parts of the cryst.

Iodine, greyish violet flakes or plates of metallic lustre. It is insoluble in water but dissolves readily in alcohol. It is also readily soluble in a solution of potass iodide. By mixing the iodine flakes with about three times their weight of iodide crystals and adding just enough water to cover the latter, the iodine dissolves at once, remaining in solution when adding further water. With starch iodine forms an intensely blue compound. Iodine stains on fingers, etc., disappear in hypo or sulphite.

Lead acetate, sugar of lead, $Pb(C_2H_3O_2)_2 3H_2O$. Clear white crystals dissolving in $1\frac{1}{2}$ times their weight of cold water; hot water should not be used. When using tap water, the solution will be slightly milky from formation of lead chloride, sulphate or carbonate. Slightly soluble in alcohol and soluble in glycerine.

Liver of sulphur, Potassa sulphurata, an impure form of potassium sulphide, containing small proportions of sulphate and carbonate of soda, hypo and polysulphide compounds. Sold in pieces of reddish-brown colour, very soluble in water.

Mercuric iodide, bi-iodide of mercury, HgI_2. Bright red powder insoluble in water, but dissolving readily in solution of potass iodide, hypo or soda sulphite. The solution in sulphite forms the Lumière mercury intensifier. Intensely poisonous.

Mercury bichloride, mercuric chloride, corrosive sublimate, $HgCl_2$. Heavy fibrous pieces or crystalline powder. One part requires 16 parts of cold water, but less than 2 parts of boiling water for solution. Much more soluble in cold water if hydrochloric acid or ammonium chloride is added. Very soluble in alcohol; less so in ether. The solutions are intensely poisonous and should on no account be allowed to come in contact with broken skin.

Metol, sulphate of methyl-paramido-phenol. White crystalline

powder, readily soluble in cold water, but almost insoluble in alcohol or ether. Metol dissolves with some difficulty in sulphite solution. Hence, in making up developers, the metol should be dissolved before the sulphite.

Nitric acid.—Strongly corrosive and fuming liquid, mixing in all proportions with water. The commercial strong pure acid of 1·42 sp. gr. contains 71 per cent. of real acid, HNO_3. Nitric acid acts vigorously on almost all metals and metallic oxides and carbonates, dissolving them with formation of nitrates. It is a powerful oxidiser of organic substances. Burns the skin and clothes.

Oxalic acid, white crystals, $H_2C_2O_4$, dissolving in 10 parts their weight of cold water and in one-third their weight of hot water. Solutions made with ordinary tap water are milky from formation of oxalate of lime. On standing, the latter settles as a white deposit from which the almost clear solution can be poured off.

Paramidophenol (base).—Yellowish-white crystalline powder, $C_6H_4OHNH_2$. Very slightly soluble in cold water; dissolves more freely in hot water. Dissolves in alcohol; less soluble in ether. The hydrochloride of paramidophenol is a crystalline powder readily soluble in 4 or 5 times its weight of water. Its keeping properties are much better than those of the free base. Like the latter, it is used for making concentrated single-solution developers in conjunction with a caustic alkali.

Potass bichromate, bichromate of potash, potass dichromate, red chromate of potash, $K_2Cr_2O_7$. Large orange-red crystals dissolving in about 14 parts of cold water; soluble in their own weight of hot water. By addition of ammonia the reddish orange colour of bichromate solution is changed to yellow, due to formation of mono or neutral chromate. Mixed with an acid, bichromate is a powerful oxidising agent. A saturated solution, mixed with about 1-20th of its volume of strong sulphuric acid, is a powerful cleanser of almost all kinds of dirt from bottles. It can be used repeatedly until exhausted.

Potass bromide, bromide of potash, KBr. Small colourless crystals, dissolving in 1½ times their weight of cold water; very slightly soluble in alcohol; soluble in 3 to 4 parts of glycerine.

Potass carbonate, carbonate of potash, K_2CO_3. Granular white powder which rapidly becomes moist by absorbing water from the air and must be kept closely stoppered. Dissolves in less than its own weight of cold water. The above refers to potass carbonate sold as "dry" or anhydrous. This is the variety to be used in photographic formulæ. The so-called "cryst" potass carbonate is of uncertain composition.

Potass chloro-platinite, protochloride of platinum and potassium, K_2PtCl_4. Small red crystals, dissolving in about 6 times their weight of cold water; insoluble in alcohol. The salt should contain nearly half its weight (46 per cent.) of platinum metal. Solutions should be made in distilled water and, with addition of a drop of hydrochloric acid, kept in well stoppered glass bottles.

Potass cyanide, cyanide of potash, KCN. Sold as white hard

pieces (fused), of qualities equivalent to 30 per cent., 40 per cent., and 90/95 per cent. real cyanide. The last (of highest strength) should be used. It is very soluble in water or alcohol. Cyanide is intensely poisonous, the solution should not be allowed to come into contact with broken skin. A further danger is the production of prussic acid vapour on addition of an acid to cyanide solution. Cyanide is a powerful solvent of silver bromide and silver chloride and also of silver iodide, but its perceptible solvent action on the developed silver image makes it a less desirable fixing agent than hypo.

Potass ferricyanide, red prussiate of potash, $K_3 Fe C_6 N_6$. Deep ruby red crystals, usually covered with a slight reddish coating. It is best to rinse the crystals in water before dissolving them; they are then seen to be clear ruby red. Ferricyanide dissolves in $2\frac{1}{2}$ times its weight of cold water, forming a yellowish brown solution if strong; greenish yellow, if weak. The solution does not keep very well; it should be kept in the dark. The keeping quality is improved by dissolving some ordinary salt along with the ferricyanide.

Potass ferrocyanide, ferrocyanide of potash, yellow prussiate of potash, $K_4 Fe C_6 N_6 \cdot 3H_2 O$. Large lemon-yellow crystals, dissolving in $3\frac{1}{2}$ times their weight of water. Insoluble in alcohol. By addition of an acid, solutions of ferrocyanide slowly give off slight fumes of the intensely poisonous prussic acid gas.

Potass iodide, iodide of potash, KI. Small white crystals, dissolving in less than their own weight of water. Slightly soluble in alcohol. Changes in the light, becoming slightly yellow. This is immaterial for its chief use in photographic work, viz., dissolving iodine.

Potass metabisulphite, $K_2 S_2 O_5$. White crystals which should be transparent, but usually have a slight incrustation, rendering them opaque. Dissolves fairly readily in cold water forming an acid solution smelling of sulphurous acid. Due to its acid nature, potass metabisulphite neutralises its own weight of cryst soda carbonate, half its weight of caustic potash, one-third its weight of caustic soda, or three-tenths its weight of dry potass carbonate. Is partially decomposed by hot water which should not be used for dissolving it.

Potass oxalate, neutral oxalate of potash, $K_2 C_2 O_4 \cdot H_2 O$. Colourless crystals dissolving in three times their weight of cold water; much more soluble in hot water. When dissolved in tap water containing lime, there is a considerable deposit of calcium oxalate. This settles in a few hours, when the almost clear solution can be poured off.

Potass permanganate, permanganate of potash, $K_2 Mn_2 O_8$. Small purple red crystals of metallic lustre. About 16 parts of cold water are required to dissolve 1 part of the crystals, but a strong solution is much more quickly made in hot water. The solution stains fingers, etc., a deep brown; the stain can be removed with a solution of metabisulphite or of oxalic acid, or by rubbing with crystals of these substances. A solution of permanganate, especially if made acid with sulphuric acid, instantly removes developer and

other stains from dishes. It leaves its brown stain, which is cleared off with metabisulphite or oxalic acid.

Pyrogallic acid, pyrogallol, tri-hydroxy-benzene, $C_6H_3(OH)_3$. Obtainable in two forms—(1) sublimed, fine feathery crystals, an ounce by weight of which occupies about 10 ozs. bulk, (2) crystallised, much denser, of about 1-10th the bulk. The properties of the two forms are the same. Extremely soluble in water and alcohol. The solution in water oxidises very rapidly and cannot be kept except with the aid of preservatives, such as sulphites, nitric acid, etc. When making up developers, the pyro should be added *after* these preservatives have been mixed with the water.

Silver nitrate, nitrate of silver, $AgNO_3$. Transparent or semi-transparent colourless flat crystals, dissolving in less than half their weight of water. To make a clear solution, distilled water must be used; the chlorides in most tap waters cause a milkiness. Solutions should be kept in glass-stoppered bottles in the dark. Silver nitrate causes intense brown or black stains on fingers or clothes; these can be removed by rubbing with tincture of iodine followed by strong solution of hypo.

Sodium acetate.—Colourless transparent crystals, $Na\,C_2H_3O_2 \cdot 3H_2O$, dissolving in less than three times their weight of cold water. Much more soluble in hot water.

Sodium bicarbonate, bicarbonate of soda, $NaH\,C\,O_3$. By grocers bicarbonate is sold as "carbonate of soda." Fine white powder requiring about 11 times its weight of cold water for solution. In hot water it is partially decomposed, forming ordinary soda carbonate. Bicarbonate is very feebly alkaline, but neutralises acids. For this reason it is used in hypo baths for the fixation of self-toning papers; the bicarbonate neutralises the acid from the papers, without, however, making the fixing bath strongly alkaline.

Sodium bisulphite, $NaHSO_3$, is obtainable in the solid state, but more readily as a solution called soda bisulphite lye of average density, 36 deg. Baumé (=1·33 sp. gr.). This is a colourless or pale yellow liquor which can be used instead of soda sulphite. But unlike sulphite it is acid, neutralising a certain proportion of the alkali of a developer.

Sodium carbonate, i.e., carbonate of soda, sold in two forms, crystal, $Na_2CO_3\ 10H_2O$, and dry or anhydrous, $Na_2\,CO_3$. Washing soda is a somewhat impure form of cryst soda carbonate, which, for photographic use, should be in small clear crystals dissolving in water to a perfectly clear solution. The "dry" carbonate is a coarse powder which actively absorbs water, and must be kept well stoppered. One part of the dry carbonate is equivalent to slightly more than 2½ parts of the cryst, *e.g.*, in making up a developer ·37 oz. (=160 grs.) of the dry is to be used in place of 1 oz. of the cryst and *vice versa*. The dry carbonate dissolves in about 6 times its weight of cold water; the cryst in 1½ times. In the United States another strength of soda carbonate is commonly used as "desiccated." It is $Na_2CO_2 \cdot H_2O$, containing 85 per cent. dry or anhydrous carbonate. 1 oz. of this desic-

cated carbonate is equivalent to 2¼ ozs. of soda carbonate cryst, or 1 oz. of the latter to ·43 oz. (190 grs.) of the desiccated.

Sodium phosphate, i.e., phosphate of soda, di-sodium phosphate, neutral phosphate of soda, $Na_2HPO_4 \cdot 12H_2O$. Large clear colourless crystals dissolving in about 7 times their weight of cold water. The solution is faintly alkaline.

Sodium sulphide.—The pure substance is in small colourless crystals, $Na_2S.9H_2O$, which rapidly become moist by exposure to the air. Exceedingly soluble in water. Commercial soda sulphide is similar except that it is yellowish in colour. By many workers the "commercial" and much cheaper sulphide is preferred for the darkening bath in sepia toning. Soda sulphide keeps well in strong solution, *e.g.*, of 20 per cent. strength, but rapidly oxidises in a weak solution. This is why the working bath in sepia toning should be made up at the time of use by mixing a little strong sulphide solution with the required quantity of water.

Sodium sulphite, i.e., sulphite of soda, $Na_2SO_3 \cdot 7H_2O$. This cryst sulphite should be in clear crystals, which should be kept well corked, otherwise they become dull and powdery from partial oxidation. Sulphite which has become slightly encrusted may be rinsed for a few seconds in a measure with enough cold water to cover it, the water poured away, and the crystals dried on a clean cloth for weighing out. Cryst sulphite is most soluble in water at about 100 deg. F., about as hot as the hand can comfortably bear. Dry or anhydrous sulphite, Na_2SO_3, is a white powder which dissolves in water more readily than the cryst. One part of it is equivalent to 2 parts of the cryst.

Starch.—Fine white powder, $C_{10}H_{10}O_5$, which is insoluble in cold water, but in boiling water forms a kind of solution which, if strong, is a fairly stiff jelly or paste (starch mountant). Pure starch powder should be used for making mountant, not the granular laundry starch.

Sulphuric acid.—Thick highly corrosive heavy liquid of 1·84 sp. gr., containing 98 per cent. of the real acid, H_2SO_4. This strong acid absorbs water rapidly from the air, becoming thereby weaker. When mixed with water, great heat is developed. The acid should always be added to the water. If water is added to the acid, the great heat may crack the vessel, and throw out part of the contents with almost explosive violence.

Sulphurous acid, solution in water of the gas SO_2. The saturated solution has sp. gr. of 1·046, equivalent to 9·5 per cent. sulphurous acid, H_2SO_3, but it rapidly loses strength by escape of SO_2 and by oxidation.

Tartaric acid. — Dry white crystals, $C_4H_6O_6$, soluble in less than their own weight of cold water, sparingly soluble in alcohol or ether, but freely soluble in glycerine.

Thiocarbamide, thio - urea, sulpho - carbamide, $CS(NH_2)_2$. Small colourless crystals requiring about 11 parts of their weight of cold water for solution, very soluble in hot water and in alcohol. In solution with an acid thiocarbamide removes developer stain.

OPTICAL CALCULATIONS.

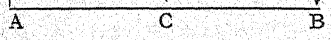
Finding Focal Length.

As simple and accurate a method as any is first to focus the lens on an object at a very great distance, say the spire of a church and to mark the position of any convenient part of the moving lens front on the fixed camera baseboard.

Then place an object, *e.g.*, a foot rule, before the camera, and focus—by moving only (1) camera as a whole, and (2) camera front on baseboard, not back of camera—until image on screen is same size as original.

The distance which the camera front has to be moved to secure this is the focal length of the lens, and is indicated by the separation of the mark on the fixed baseboard from that on the lens front in its final (same-size) position.

Suppose that A B represents



the baseboard of the camera, A being the rear portion carrying the back. Suppose that the lens, when focussed on a distant object, requires the camera front to be in the position shown by the arrow at C.

If now we focus on an object so as to get a same size image on the focussing screen, the camera front will require to be racked out, say, to the position of the arrow at B. The distance from C to B will then be the focal length of the lens.

Focal Distances, etc.

Throughout the formulæ, on the next page, the following symbols are used as follows:—

f = the focal length or "focus" of the lens.

u = the distance of the *object* from the lens.

v = the distance of the *image* from the lens, *e.g.*, camera extension in copying, lens-easel distance in enlarging.

D = distance from object to image, neglecting nodal space, which in most lenses, is small compared with D.

R = number of times that the size (linear) of the object divides into that of the image, *i.e.*, No. of times of enlargement.

r = number of times that the size (linear) of the image divides into that of the object, *i.e.*, No. of times of reduction.

The distances u and v are reckoned respectively from the admission and exit nodes of a lens. For practical purposes (except with telephoto lenses) it is near enough to take these as situated at the diaphragm of a compound lens or at the surfaces of a single lens.

All the formulæ are derived from the parent formula:

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

which, in its various forms, allows of practically any calculation of image or object size, scale of enlargement or reduction, camera extension, etc., being readily made.

Scale of Reproduction.

$R = \frac{\text{size of image}}{\text{size of object}}$ (linear)

R is No. of times of enlargement.

$r = \frac{\text{size of object}}{\text{size of image}}$ (linear)

r is No. of times of reduction.

$$R = \frac{v}{u} \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

$$R = \frac{f}{u-f} \ldots \quad \ldots \quad \ldots \quad (2)$$

$$R = \frac{v-f}{f} \ldots \quad \ldots \quad \ldots \quad (3)$$

$$R = \frac{D-2f}{f} \text{ (approx.)} \quad \ldots \quad (4)$$

$$r = \frac{u}{v} \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

$$r = \frac{u-f}{f} = \frac{u}{f} - 1 \quad \ldots \quad (6)$$

$$r = \frac{f}{v-f} \quad \ldots \quad \ldots \quad (7)$$

$$r = \frac{D-2f}{f} \text{ (approx.)} \quad \ldots \quad (8)$$

Focal Length.

$$f = \frac{u \times R}{R+1} = \frac{u}{r+1} \ldots \quad (9)$$

$$f = \frac{v \times r}{r+1} \ldots (10)$$

$$f = \frac{D \times R}{(R+1)^2} = \frac{D \times r}{(r+1)^2} \quad (11)$$

$$f = \frac{D}{R+2} = \frac{D}{r+2} \quad (12) \text{ (approx.)}$$

$$f = \frac{u \times v}{D} \quad \ldots \quad \ldots \quad (13)$$

Distance of Object from Lens.

$$u = \frac{v}{R} = v \times r \quad \ldots \quad \ldots \quad (14)$$

$$u = \frac{f}{R} + f = (r+1) \times f \ldots (15)$$

$$u = \frac{f \times v}{v-f} \quad \ldots \quad \ldots \quad (16)$$

$$u = \frac{D}{R+1} = \frac{r \times D}{r+1} \quad (17)$$

Distance of Image from Lens.

$$v = u \times R = \frac{u}{r} \quad \ldots \quad (18)$$

$$v = (f \times R) + f = \frac{f}{r} + f \quad (19)$$

$$v = \frac{f \times u}{u-f} \quad \ldots \quad (20)$$

$$v = \frac{R \times D}{R+1} = \frac{D}{r+1} \ldots \quad (21)$$

Object-Image Distance.

$$D = f \times (R + \frac{1}{R} + 2) =$$

$$f \times (r + \frac{1}{r} + 2) \ldots \quad (22)$$

$$= \frac{f \times (R+1)^2}{R} = \frac{f \times (r+1)^2}{r} \quad (23)$$

$$= f \times (R+2) = f \times (r+2) \quad (24) \text{ (approx.)}$$

$$D = v \times \frac{(R+1)}{R} = v \times (r+1) \quad (25)$$

$$D = u \times (R+1) = \frac{u \times (r+1)}{r} \quad \ldots \quad (26)$$

Notes on the Formulæ.

No. 2.—If the distance u of an object is very great relatively to the focal length f, the latter becomes negligible relatively to u, so that the formula becomes $R = \frac{f}{u}$ according to which the size of the image is directly proportional to f, and inversely proportional to u. While theoretically this is never so, the size of image is proportional (within an error of 1 per cent.) to the distance of the object if the distance of the object is at least 100 times the focal length of the lens. (See B.J., 1921, November 18th, p. 686.)

Nos. 3, 7, 16.—When the distance u of the object is very great relatively to the focal length, the distance v of the image from the lens becomes nearly equal to f, and, in consequence of depth of focus, actually equal to f. In these circumstances corresponding with the photography of distant objects, Formulæ 3, 7 and 15 cease to apply.

Nos. 1, 2, 3, 5, 6, 7.—Bearing in mind the definitions of R and r these formulæ permit the calculation of the size of image obtained of an object of known size at a given distance with a lens of given focal length and, *vice versa*, the size of an object yielding an image of known size.

Nos. 4, 8, 12, 24.—These approximate formulæ yield results sufficiently near for practical purposes if R or r is greater than about 9 or 10.

No. 20.—If u is very great, compared with f, $u - f$ becomes practically equal to u, and therefore $v = f$.

Examples.

The following examples will serve to illustrate the use of those of the above formulæ which are chiefly employed for practical purposes :—

A picture 12 × 6 ft., 20 ft. from the lens is photographed with a 10 in. lens. What is the size of the copy? 12 ft. = 144 ins. 20 ft. = 240 ins. From *Formula 2*, $144 \times 10 \div (240 - 10) = 144 \times 10 \div 230 = 6{\cdot}26$ ins. The copy therefore measures $6{\cdot}26 \times 3{\cdot}13$ ins.

Copying to Scale.

In making the copy of a painting on a scale of one-seventh, what focal length is required if the painting is 20 ft. distance. In *Formula 9*, $u =$ 20 ft. $r = 7$. $r + 1 = 8$. The required focal length is therefore $20 \div 8 = 2\frac{1}{2}$ ft. = 30 ins.

Enlarging with Camera.

Camera has extension of 14 ins. What is greatest degree of enlargement that can be obtained when using 4 in. lens? 14–4 = 10 in. $10 \div 4 = 2\frac{1}{2}$; that is, maximum enlargement is $2\frac{1}{2}$ times (*Formula 3*).

Maximum Focal Length.

In a camera for copying-enlarging up to 4 times, an extension of 30 ins. (lens to plate) can be obtained. What is the maximum focal length of lens which can be used? $4 + 1 = 5$. $30 \div 5 = 6$. (*Formula 10.*) Maximum focal length is 6 ins.

In copying originals half scale with camera of 9 ins. extension, what is maximum focal length of lens which can be used? $9 \times 2 = 18$. $18 \div 3 = 6$ ins. (*Formula 10.*) Focal length must not be greater than 6 ins.

Camera Extensions.

What is the required camera extension for copying $8\frac{1}{2} \times 6\frac{1}{2}$ ins. to $4\frac{1}{4} \times 3\frac{1}{4}$ ins. with a 12 in. lens? In *Formula 19*, reduction figure = 2. $12 \div 2 = 6$. $6 + 12 = 18$ ins.

What is the required camera extension when enlarging $4\frac{1}{4} \times 3\frac{1}{4}$ in. plate to $8\frac{1}{2} \times 6\frac{1}{2}$ ins. with 12 in. lens = 2 times enlargement? In *Formula 19*, $f = 12$; $R = 2$. $12 \times 2 = 24$. $24 + 12 = 36$ ins. = 3 ft.

Enlarging Space.

Enlargements up to 10 diameters are to be made with 8 in. lens. What space is required between negative and easel? In *Formula 23*, $R + 1 = 11$. $11 \times 11 = 121$. $121 \times 8 = 968$. $968 \div 10 = 96{\cdot}8$ ins. = 8 ft. $\frac{3}{4}$ in.

Studio Space.

For making full-length cabinet portraits with 12 in. lens, what distance is required between sitter and focussing screen? If sitter is 70 ins. and figure is 5 ins. on negative, $r = 14$. In *Formula 23*, $r + 1 = 15$. $15 \times 15 = 225$ ins. $225 \times 12 = 2{,}700$. $2{,}700 \div 14 = 192\frac{3}{4} = 16$ ft. $\frac{3}{4}$ in.

Magnifiers.

When using a supplementary lens (magnifier) as a means of bringing near objects into focus, when employing a camera fitted with a lens adjusted for use at fixed focus, the focal length of the supplementary lens must be equal to the distance of the object. This holds good whatever the focal length of the original lens.

Altering Focal Length.

The rule (very rough, on account of the impossibility of knowing from which part of a lens mount to measure) for finding the focal length of an extra lens, to reduce or increase the focal length of a given lens is as follows:—

Multiply the focal length to be altered by the final focal length desired, and divide the product by the original focal length less the final focal length.

That is: $f_2 = \dfrac{f_1 \times F}{f_1 - F}$

where f_1 is the original focal length,

F the final focal length required.

and f_2 the focal length of the necessary added lens.

To increase the focal length use a negative lens.

To reduce the focal length use a positive lens.

Telephoto Rules.

F = equivalent focal length of complete lens.

f_1 = equivalent focal length of positive.

f_2 = equivalent focal length of negative.

E = camera extension, from negative lens to ground glass.

M = magnification, that is, number of times the image given by the complete lens is larger than that given by positive alone.

Magnification when working at given extension is found by dividing camera extension by

focal length of negative lens and adding 1.

$$M = \frac{E}{f_2} + 1.$$

Camera extension, necessary for given magnification,—multiply focal length of negative lens by magnification less 1.

$$E = f_2 (M - 1).$$

Focal length of complete lens.—Multiply focal length of positive by magnification.

Diaphragm Numbers.

EXPOSURES AT DIFFERENT APERTURES.

F. Numbers ...	1·8	2	2·2	2·5	2·7	2·9 3	3·16	3·4
Rel. Exposure Required—								
Fractions ...	2/3	3/4	1	1¼	1½	1¾	2	2⅓
Decimal ...	0·83	1	1·33	1·66	2	2·33	2·66	3
Seconds ...	1/1200	1/1000	1/750	1/600	1/500	1/428	1/375	1/325

F. Numbers ...	3·5	3·9 4	4·5	5	5·6	6	6·3	8
Rel. Exposure—								
Fractions ...	2½	3	4	5	6	7	8	12
Decimal ...	3·33	4	5·3	6·66	8	9·3	10·6	16
Seconds ...	1/300	1/250	1/190	1/150	1/125	1/100	1/95	1/60

The above table gives the relative exposures with lens apertures. The Fraction line gives a series of F/Nos. each requiring double the exposure of the preceding one. This series is F/2·2, 3·16, 4·5, 6·3. The Decimal line gives a similar series, beginning with *f*/2, viz., F/2, 2·7, 4, 5·6, 8. The last line gives the relative Speed of any lens, in comparison with another lens of different aperture.

EQUIVALENT F/- AND UNIFORM SYSTEM NUMBERS.

Rel. Exposure Req'd	1	2	4	8	16	32	64	128
F Nos.	4	5·6	8	11·3	16	22·6	32	45·2
U.S. Nos.	1	2	4	8	16	32	64	128

Among Continental opticians at the present time it is usual to adopt a different series of F/Nos. each requiring double the exposure of the preceding one. This series is :—

F/No.	3·16	4·5	6·3	9	12·5	18	25·3	36

NOTE.—Most lenses are now marked with the F/numbers, according to one or other of the above two series, although the U.S. numbers are used on Kodak lenses. Also the actual diameter of the diaphragm aperture in millimetres is marked on some Continental lenses.

Depth of Focus.

Table for simpler and more accurate calculation of the distances (hyperfocal distances) at and beyond which all objects are in focus when sharp focus is secured on infinity calculated for a disc of confusion of 1/100th inch in an enlargement of 10 inch diagonal; or, in other words, for a disc of confusion of one thousandth of the diagonal of the plate or film.

Note.—The figures in the table are not hyperfocal distances but are used for simply calculating these latter as directed below.

By R. DE B. ADAMSON, B.Sc.

Focal Length of Lens in inches.	Size of Plate.							
	2 5/16 × 1¾	2¼ × 2¼	3¼ × 2¼	3¼ × 2½	4¼ × 2½	4¼ × 3¼	4⅝ × 2⅞	P.C. & 5 × 4
	Hyperfocal Distances in feet multiplied by the F/No. used.							
3	260	236	190	174	152	140	133	117
3½	300	277	223	205	178	164	155	137
3½	350	320	258	238	207	191	180	159
3¾	400	368	296	273	238	219	207	183
4	460	420	337	310	271	249	236	208
4½	520	473	381	350	306	281	266	235
4½	580	530	427	392	343	315	298	264
4¾	650	591	476	437	382	351	332	294
5	720	655	527	484	423	389	368	326
5½	792	722	581	534	466	429	406	359
5½	870	793	638	586	511	471	446	394
5¾	950	867	697	640	558	515	488	430
6	1,040	944	760	696	608	560	532	468
6½	1,220	1,110	892	820	712	656	620	548
7	1,410	1,280	1,030	952	828	764	720	636
7½	1,620	1,470	1,180	1,090	952	876	828	732
8	1,840	1,680	1,350	1,240	1,080	996	944	832
9	2,330	2,120	1,710	1,570	1,370	1,260	1,190	1,060
10	2,870	2,620	2,110	1,940	1,690	1,560	1,470	1,300
11	3,480	3,170	2,550	2,340	2,040	1,880	1,780	1,580
12	4,140	3,780	3,040	2,780	2,430	2,240	2,130	1,870

The hyperfocal distance corresponding with any focal length and lens aperture is found by dividing the figure given above for one or other of the eight plate sizes by the *f*/No.

For example, to find the hyperfocal distance for a 4-in. lens used in making a 2 5/16 × 1¾ in. negative. The figure from the table is 460. This is found opposite 4 (focal length) in the column indicating this size of plate. 460 ÷ 4·5 = 102, *i.e.*, the hyperfocal distance is 102 ft. With *f*/5·6 it is 460 ÷ 5·6=82 ft., and so on. Readers will find it useful to prepare a table in this way for their own lenses, viz. :—

Focal Length.	Plate.	F/	F/	F/	F/8	F/11	F/16	F/22	F/32

Extreme care in focussing is required if the hyperfocal distance exceeds 100 feet for scale focussing, or 200 feet for reflex work.

If sharpest focus be secured on the hyperfocal distance all objects from half that distance to infinity will be in focus. If H be the hyperfocal distance and if sharpest focus be secured on any distance D feet, then all objects lying between $\frac{HD}{H+D-f}$ and $\frac{HD}{H-D+f}$ feet from the camera will be in focus (f is the focal length of the lens in feet—usually negligible).

Lenses for Studios.

Focal Lengths of Lenses for Studios of Various Lengths.

The following table shows the focus of lens which is suitable for comfortable working in studios of various lengths. In each case it is assumed that 5 ft. of the length will be taken up by camera, operator, sitter and background. The figures in column 1 are the full run of the studio, including this 5ft. In the case of the short studios the focal lengths are about the longest which can be used: in the case of the longer studios somewhat greater focal lengths might be used, but the lenses directed in the table are about the best for general work.

Length of Studio. Feet	C.D.V. full length Inches.	C.D.V. half length and Cabinet full length. Inches.	C.D.V. head, Cabinet half length. Inches.	Cabinet head and Boudoir full length. Inches.	Boudoir half length, Panel full length. Inches.	Boudoir head, Panel half length Inches.
12	4*	6½*	8½	9*	12*	14
14	4¾*	7½*	9	10*	13*	16
16	5¾	8½	10	10½	16	18
18	6	8½	10½	10½	16	18
20	6	10	10½	12	18	20
22	7	10½	12	14	22	22
24	8½	12	14	16	24	24
28	8½	13½	16	16	24	24
30	10	13½	16	18	24	24

* Full lengths may be obtained with these focal lengths, but the standpoint is so near to the sitter that good perspective cannot be expected.

Distances When Enlarging and Reducing.

Focus of Lens, inches	TIMES OF ENLARGEMENT AND REDUCTION. 1	2	3	4	5	6	7	8
	inches	inches	inches	inches	inches	inches	inches	inches
3	6	9	12	15	18	21	24	27
	6	4½	4	3¾	3⅗	3½	3⅜	3⅜
3½	7	10½	14	17½	21	24½	28	31½
	7	5¼	4⅔	4⅜	4⅕	4 7/12	4	3 15/16
4	8	12	16	20	24	28	32	36
	8	6	5⅓	5	4⅘	4⅔	4⅓	4½
4½	9	13½	18	22½	27	31½	36	40½
	9	6¾	6	5⅝	5⅖	5¼	5⅐	5 1/16
5	10	15	20	25	30	35	40	45
	10	7½	6⅔	6¼	6	5⅚	5⅝	5⅝
5½	11	16½	22	27½	33	38½	44	49½
	11	8¼	7⅓	6⅞	6⅗	6 5/12	6⅜	6 3/16
6	12	18	24	30	36	42	48	54
	12	9	8	7½	7⅕	7	6⅞	6¾
7	14	21	28	35	42	49	56	63
	14	10½	9⅓	8¾	8⅖	8⅛	8	7⅞
8	16	24	32	40	48	56	64	72
	16	12	10⅔	10	9⅗	9⅓	9⅛	9
9	18	27	36	45	54	63	72	81
	18	13½	12	11¼	10⅘	10½	10⅛	10⅛
10	20	30	40	50	60	70	80	90
	20	15	13⅓	12½	12	11⅔	11⅜	11¼
11	22	33	44	55	66	77	88	99
	22	16½	14⅔	13¾	13⅕	12⅚	12⅝	12⅜

The table is used as follows :—Knowing the focal length of the lens to be used and the degree of (linear) enlargement or reduction, look up the figure for enlargement or reduction in the upper horizontal row, and carry the eye down the column below it until it reaches the horizontal line of figures opposite the focal length of lens in the left-hand column.

When *enlarging*, the greater of the two distances where the two lines join is the distance from lens to the sensitive paper or plate. The lesser is the distance from lens to negative, or picture being enlarged direct in camera.

When *reducing*, the distances are *vice-versa* : the greater is the distance from lens to original, the smaller from lens to sensitive plate.

Relative Exposures When Enlarging

(*Without a Condenser*).

New Times of Enlargement	Time of enlargement for which exposure is known.											
	1	1½	2	2½	3	3½	4	5	6	8	10	12
1	1	¾	½	⅜	¼	⅕	1/6	1/9	1/12	1/20	1/30	1/40
1½	1½	1	¾	½	⅜	⅓	¼	⅛	1/8	1/12	1/20	1/30
2	2¼	1½	1	¾	½	⅖	⅓	¼	⅙	1/9	1/12	1/20
2½	3	2	1¼	1	¾	⅗	½	⅜	¼	1/6	1/10	1/15
3	4	2½	1⅘	1¼	1	¾	⅔	½	⅓	1/5	1/8	1/11
3½	5	3½	2¼	1¾	1¼	1	⅘	⅝	½	¼	1/6	1/9
4	6	4	3	2	1½	1¼	1	¾	½	⅜	⅕	1/7
5	9	6	4	3	2¼	1¾	1½	1	¾	½	⅖	1/5
6	12	8	5	4	3	2½	2	1¼	1	⅝	½	⅖
8	20	13	9	7	5	4	3½	2¼	1¾	1	⅝	¼
10	30	19	13	10	7	6	5	3½	2½	1½	1	¾
12	42	27	19	14	11	8	7	4½	3½	2	1½	1

To use this table find in the top horizontal line the number of times of enlargement for which exposure is known. Under this number the relative time of exposure for different degrees of enlargement will be found opposite the new times of enlargement in first vertical column.

Relative Exposures When Copying.

New Scales of Reduction	Scale of reduction for which exposure is known.											
	1	¾	⅔	½	⅓	¼	⅕	1/6	⅛	1/10	1/20	1/30
1	1	1¼	1½	1¾	2¼	2½	3	3	3	3½	3½	3½
¾	¾	1	1 1/10	1¼	1¾	2	2	2¼	2½	2½	3	3
⅔	⅔	⅞	1	1¼	1½	1⅗	2	2	2¼	2¼	2½	2½
½	⅝	¾	1	1¼	1¼	1½	1½	1¾	2	2	2	2
⅓	⅖	⅗	⅘	1	1¼	1 1/9	1½	1¾	1½	1½	1⅔	1¾
¼	⅜	½	⅝	¾	1	1	1¼	1¼	1⅛	1¼	1½	1½
⅕	⅔	⅓	½	⅔	⅘	1	1	1	1⅙	1⅛	1⅛	1¼
1/6	½	⅓	⅖	½	⅗	⅘	1	1	1	1⅛	1⅛	1¼
⅛	⅓	⅙	⅖	⅖	⅖	⅗	⅘	1	1	1	1 1/10	1⅛
1/10	⅕	⅒	⅕	⅕	⅖	⅖	⅗	⅘	1	1	1	1⅛
1/20	1/10	1/20	1/10	1/10	⅕	⅕	⅖	⅖	1	1	1	1
1/30	1/15	1/30	1/15	1/15	1/10	1/10	⅕	⅕	⅞	⅞	1	1

To use this table find in the top horizontal line the scale of reduction for which exposure is known. Under this scale the relative time of exposure for different degrees of reduction will be found opposite the new scales of reduction marked in first vertical column.

Table of Distances for Lantern Projection.

DISTANCE OF PROJECTION LENS FROM SCREEN, MASK BEING THREE INCHES.

Foci	4½	5	5½	6	7	8	9	10	11	12	14	15	16
Disc.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft.	ft. in.	ft. in.	ft. in.
5	7 10½	8 9	9 7½	10 6	12 3	14 0	15 9	17 6	19 3	21	24 6	26 3	28 0
6	9 4½	10 5	11 5½	12 6	14 7	16 8	18 9	20 10	22 11	25	29 2	31 3	33 4
7	10 10½	12 1	13 3½	14 6	16 11	19 4	21 9	24 2	26 7	29	33 10	36 3	38 8
8	12 4½	13 9	15 1½	16 6	19 3	22 0	24 9	27 6	30 3	33	38 6	41 3	44 0
9	13 10½	15 5	16 11½	18 6	21 7	24 8	27 9	30 10	33 11	37	43 2	46 3	49 4
10	15 4½	17 1	18 9½	20 6	23 11	27 4	30 9	34 2	37 7	41	47 10	51 3	54 8
11	16 10½	18 9	20 7½	22 6	26 3	30 0	33 9	37 6	41 3	45	52 6	56 3	60 0
12	18 4½	20 5	22 5½	24 6	28 7	32 8	36 9	40 10	44 11	49	57 2	61 3	65 4
13	19 10½	22 1	24 3½	26 6	30 11	35 4	39 9	44 2	48 7	53	61 10	66 3	70 8
14	21 4½	23 9	26 1½	28 6	33 3	38 0	42 9	47 6	52 3	57	66 6	71 3	76 0
15	22 10½	25 5	27 11½	30 6	35 7	40 8	45 9	50 10	55 11	61	71 2	76 3	81 4
16	24 4½	27 1	29 9½	32 6	37 11	43 4	48 9	54 2	59 7	65	75 10	81 3	86 8
18	27 4½	30 5	33 5½	36 6	42 7	48 8	54 9	60 10	66 11	73	85 2	91 3	97 4
20	30 4½	33 9	37 1½	40 6	47 3	54 0	60 9	67 6	74 3	81	94 6	101 3	108 0
25	37 10½	42 1	46 3½	50 6	58 11	67 4	75 9	84 2	92 7	101	117 10	126 3	134 8
30	45 4½	50 5	55 5½	60 6	70 7	80 8	90 9	100 10	110 11	121	141 2	151 3	161 4
35	52 10½	58 9	64 7½	70 6	82 3	94 0	105 9	117 6	129 3	141	164 6	176 3	188 0
40	60 4½	67 1	73 9½	80 6	93 11	107 4	120 9	134 2	147 7	161	187 10	201 3	214 8

WEIGHTS AND MEASURES.

Inches and Millimetres.

INCHES INTO MILLIMETRES.				MILLIMETRES INTO INCHES.			
Inches.	Millimetres.	Inches.	Millimetres.	Millimetres.	Inches.	Millimetres.	Inches.
1	25·4	$\frac{3}{8}$	9·5	0·1	0·0039	13	0·51
$\frac{15}{16}$	23·8	$\frac{11}{32}$	8·7	0·5	0·015	14	0·55
$\frac{9}{10}$	23·0	$\frac{5}{16}$	7·9	1	0·04	15	0·59
$\frac{7}{8}$	22·2	$\frac{9}{32}$	7·1	2	0·08	16	0·63
				3	0·12	17	0·67
$\frac{13}{16}$	20·6	$\frac{1}{4}$	6·4	4	0·16	18	0·71
$\frac{3}{4}$	19·1	$\frac{7}{32}$	5·6	5	0·20	19	0·75
$\frac{11}{16}$	17·5	$\frac{3}{16}$	4·8	6	0·24	20	0·79
				7	0·28	21	0·83
$\frac{5}{8}$	15·9	$\frac{1}{8}$	3·2	8	0·31	22	0·87
$\frac{9}{16}$	14·3	$\frac{3}{32}$	2·4	9	0·35	23	0·90
$\frac{1}{2}$	12·7	$\frac{1}{16}$	1·6	10	0·39	24	0·94
$\frac{7}{16}$	11·1	$\frac{1}{32}$	0·8	11	0·43	25	0·98
				12	0·47	25·4	1·0

English Sizes of Plates.

Inches.	Cm.	Inches.	Cm.
$3\frac{1}{2} \times 2\frac{1}{2}$	8·9 × 6·4	7 × 5	17·8 × 12·7
$3\frac{1}{4} \times 3\frac{1}{4}$	8·25 × 8·25	$8\frac{1}{2} \times 6\frac{1}{2}$	21·5 × 16·5
$4\frac{1}{4} \times 3\frac{1}{4}$	10·8 × 8·25	10 × 8	25·4 × 20·3
5 × 4	12·7 × 10·1	12 × 10	30·4 × 25·4
$6\frac{1}{2} \times 4\frac{3}{4}$	16·5 × 12·0	15 × 12	38·1 × 30·4

Continental Sizes of Plates in Common Use.

Cm.	Inches.	Cm.	Inches.
4·5 × 6·0	$1\frac{3}{4} \times 2\frac{3}{8}$	13 × 21	5·12 × 8·25
9 × 12	3·54 × 4·72	18 × 24	7·08 × 9·44
12 × 16	4·72 × 6·30	24 × 30	9·44 × 11·81
13 × 18	5·12 × 7·08	30 × 40	11·81 × 15·75

Sizes of Lantern Slides (Various Countries).

The standard size of English lantern slides is $3\frac{1}{4} \times 3\frac{1}{4}$ inches. The standard French size for lantern slides is 85×100 mm. (the longer side horizontal). The American size is 4 (base) $\times$ $3\frac{1}{4}$ (height) inches, though some makers use $4\frac{1}{4} \times 3\frac{1}{4}$ inches.

British Weights and Measures.

The formulæ in the editorial pages of this ALMANAC are given, in almost all cases, in both British and metric measures, and in adopting this course we have had the desire to impress upon photographers the simplicity and facility of the latter system. As a rule, the British formulæ are expressed in grains or ounces per 20 ozs. of solution, and the metric formulæ in grammes per 1000 c.c.s. In regard to the total bulk of solution, our formulæ are mostly drawn up on the basis that the total bulk after the solution of the solids is that stated in the formula—20 ozs. or 1000 c.c.s. as a rule.

What are Percentage Solutions?

The usual practice in making a solution to a specified percentage strength is to consider the weight of the substance to be dissolved in relation to the volume of the completed solution. Thus, to make a 10 per cent. solution, we dissolve 1 ounce avoirdupois in enough water to make the volume of the solution 10 fluid ounces. If, however, the object is to make a solution of which some sub-division of a fluid ounce will contain a grain or an exact number of grains, then the number of minims or drachms of the completed solution must be an exact multiple of the number of grains dissolved. Thus, if 1 oz. Av. of 437.5 grains be dissolved in enough water to make the volume of the solution 4,375 minims (approximately 9 ozs. 1 drachm) every 10 minims of the solution will contain 1 grain of the substance.

Formulæ Stated in Parts.

Formulæ given, as many are, in "parts," may be made up by writing gms. for the solid and c.c.s. for the fluid "parts," and converting them into the British measures by any of the tables in this section. Thus: Pyro, 10 parts; sodium sulphite, 100 parts; water, 1000 parts, becomes Pyro, 154 grs.; sodium sulphite, 3 ozs. 230 grs.; water, 35 ozs.

1. APOTHECARIES WEIGHT.

20 Grains = 1 Scruple.
3 Scruples = 1 Drachm = 60 Grains.
8 Drachms = 1 Ounce = 480 Grains.

It is now customary in formulæ to employ the avoirdupois ounce ($437\frac{1}{2}$ grains), but where "drachms" are given the apothecaries' drachm of 60 grains is meant.

2. AVOIRDUPOIS WEIGHT.

437½ Grains = 1 Ounce.
16 Ounces = 1 Pound = 7,000 Grains.
¼ ounce = 109 grains ; ½ ounce = 219 grains ; ¾ ounce = 328 grains

3. FLUID MEASURE.

60 Minims	= 1 Drachm.			
8 Drachms	= 1 Ounce	= 480 Minims.		
20 Ounces	= 1 Pint	= 160 Drachms	= 9,600 Minims.	
2 Pints	= 1 Quart	= 40 Ounces	= 320 Drachms.	
4 Quarts	= 1 Gallon	= 160 Ounces	= 1,280 Drachms.	

1 fluid ounce of water weighs 437½ grains, therefore every minim weighs 0·91 grain.

In the United States the pint is of 16 ozs., the quart of 32 ozs., and the gallon of 128 ozs.

Metric Weights and Measures.

The unit of weight is the gramme, written "gm." ; the subdivisions are the "deci-" (1/10th), "centi-" (1/100th), and "milligramme" (1/1,000th) ; the multiples are the "deka-" (10 gm.) and "hectogramme" (100 gm.), but in practice it is usual to write these quantities as : 0·1 or 0·01 and 10 or 100 grammes, and the abbreviation "kilo." for 1,000 gms.

The following are the equivalents of Metric Weights and Measures in terms of Imperial Weights and Measures :—

LINEAR MEASURE.

1 Millimetre (mm.) (1/1,000th M.) = 0·03937 inch.
1 Centimetre (1/100th M.) ... = 0·3937 ,,
1 Metre (M.) ... ... = 39·370113 inches. / 3·280843 feet. / 1·0936143 yard
Kilometre (1,000 M.) ... ... = ·62137 mile.

SQUARE MEASURE.

1 Square Centimetre ... ... = ·155 square inch.
1 Square Metre (100 square decimetres) ... ... = 10·7639 square feet. / 1·196 square yards.

WEIGHT.

	Avoirdupois.
1 Milligramme (1/1,000th gm.) =	0·015 grain.
1 Gramme (1 gm.) ... ... =	15·432 ,,
1 Kilogramme (1,000 gm.) ... =	2·2046223 lbs. or / 35·273957 ozs.

FLUID MEASURE.

1 Cubic centimetre (c.c.) (1·1,000th litre) = 16·9 minims.
1 Litre (1 L.) = 35 ozs. 94 m. = 16894·1 minims.

Grammes Into Grains and Ounces (Avoirdupois).

Gms.	Ozs.	Grs.	Gms.	Ozs.	Grs.	Gms.	Ozs.	Grs.
0·1		1·5	16		28·1	130	4½	37
0·2		3·1	17	½	43·5	140	4¾	82
0·3		4·6	18	½	59·0	150	5¼	18
0·4		6·2	19	½	74·4	160	5½	61
0·5		7·7	20	½	89·8	170	6	0
0·6		9·1	25	¾	57·0	175	6	76
0·7		10·8	30	1	25	180	6¼	44
0·8		12·4	35	1	103	190	6½	88
0·9		13·9	40	1¼	71	200	7	24
1		15·4	45	1½	38	250	8¾	32
2		30·9	50	1¾	6	300	10½	31
3		46·3	55	1¾	83	350	12¼	41
4		61·7	60	2	51	400	14	50
5		77·2	65	2¼	19	450	15¾	52
6		92·6	70	2¼	94	500	17½	61
7		108·0	75	2½	64	550	19¼	66
8	¼	14·1	80	2¾	32	600	21	70
9	¼	29·5	85	3	0	650	22¾	72
10	¼	44·9	90	3	76	700	24½	81
11	¼	60·4	95	3¼	44	750	26¼	90
12	¼	75·8	100	3½	11	800	28	95
13	¼	91·2	110	3¾	56	850	29¾	102
14	¼	106·7	120	4	102	900	31½	106
15	½	12·7	125	4¼	70	1,000	35¼	11

Numbers of Grains in Ozs. (Avoirdupois).

Note.—In the above table the British equivalents are given in the form most convenient for actual work, viz., in even ounces and quarter ounces, with odd grains over. If calculations need to be made, the following figures giving the equivalents of ounces and quarter-ounces in grains will be found useful:—

¼ oz. = 109 grs.	1¾ oz. = 765 grs.	3¼ ozs. = 1,421 grs.	4¾ ozs. = 2,078 grs.
½ oz. = 219 grs.	2 ozs. = 875 grs.	3½ ozs. = 1,531 grs.	5¼ ozs. = 2,296 grs
¾ oz. = 328 grs.	2¼ ozs. = 984 grs.	3¾ ozs. = 1,640 grs.	5½ ozs. = 2,406 grs.
1 oz. = 437 grs.	2½ ozs. = 1,094 grs.	4 ozs. = 1,750 grs.	6 ozs. = 2,625 grs.
1¼ oz. = 546 grs.	2¾ ozs. = 1,203 grs.	4¼ ozs. = 1,859 grs.	6¼ ozs. = 2,734 grs
1½ oz. = 656 grs.	3 ozs. = 1,312 grs.	4½ ozs. = 1,969 grs.	6½ ozs = 2,844 grs.

Conversion of British into Metric Measures.

Grains into Grammes.

Grs.	Gms.	Grs.	Gms.	Grs.	Gms.
1	0·065	16	1·037	35	2·268
2	0·13	17	1·102	40	2·592
3	0·194	18	1·166	45	2·916
4	0·259	19	1·232	50	3·240
5	0·324	20	1·296	55	3·564
6	0·389	21	1·361	60	3·888
7	0·454	22	1·426	65	4·212
8	0·518	23	1·490	70	4·536
9	0·583	24	1·555	75	4·860
10	0·648	25	1·620	80	5·184
11	0·713	26	1·685	85	5·508
12	0·775	27	1·750	90	5·832
13	0·842	28	1·814	95	6·156
14	0·907	29	1·880	100	6·480
15	0·972	30	1·944		

Ounces (Avoirdupois) to Grammes.

Ozs.	Gms.	Ozs.	Gms.	Ozs.	Gms.
¼	7·09	4	113·40	13	368·54
½	14·17	5	141·75	14	396·89
¾	21·26	6	170·10	15	425·24
1	28·35	7	198·45	16	453·59
1½	42·5	8	226·80	17	481·94
2	56·70	9	255·15	18	510·29
2½	70·87	11	311·8	19	538·64
3	85·05	12	340·19	20	566·99

Minims, Drachms and Ounces (Fluid) to C.C.S.

Minims.	C.c.s.	Drs.	C.c.s.	Ozs.	C.c.s.	Ozs.	C.c.s.
5	·3	½	1·78	1½	42·6	11	312·5
10	·6	1	3·55	2	56·8	12	341·0
15	·9	2	7·10	3	85·2	13	369·3
20	1·2	3	10·65	4	113·6	14	398·0
25	1·4	4	14·20	5	142·0	15	426·0
		5	17·75	6	170·5	16	454·5
		6	21·30	7	198·9	17	483·0
		7	24·86	8	227·3	18	511·5
		8	28·41	9	255·7	19	540·0
		1 oz.		10	284·0	20	568·0

Note. — In United States the fluid ounce contains 29·57 c.c.s.

C.c.s. to Minims and Ozs.—It is near enough to use the table on page 456, reckoning gms. as c.c.s. and grains as minims. Example, 35 c.c.s. equal 1 oz. (fluid) + 103 minims.

Conversion Rules—*Gms. per litre into grains per oz.*—Multiply the grammes by 0·44.

C.c.s. per litre into minims per ounce.—Divide the c.c.s. by 2 (more exactly, multiply by 0·48).

Grains per ounce into grammes per litre.—Multiply the grains by 2·3. Thus 50 grs. per oz. = 115 gms. per litre.

Minims per ounce into c.c.s. per litre.—Multiply the minims by 2.

Tables in Past Almanacs.

The following is a list of tables which have appeared in past issues of the "Almanac," but are not included among those in the present volume.

The reference in brackets after each s to the most recent issue of the "Almanac" in which the table has appeared: in most cases it will be found included for several years prior to the date of this reference.

CHEMICAL

Simplification of Emulsion Calculations (Equivalence of Alkaline Haloid Salts.) (1903, p. 1160.)

Solubility of the Silver Haloids.—Valenta. (1907, p. 1109.)

Freezing Mixtures. (1907, p. 1116.)

Developing Equivalence of the Alkalis. (1903, p. 1159.)

Chemical Reactions of the known Developing Agents (Tests of Developers). 1904, p. 1010.)

Pyro Developers recommended for various Plates by Makers. (1890, p. 666.)

Tables of Developers (in grains per oz.) for various Commercial Plates. (1912, p. 761.)

Formulæ of Chemicals. (1924, p. 483.)

Solubilities of Chemicals. (1924, p. 489.)

Poisons and Antidotes. (1927, p. 449.)

LIGHT AND EXPOSURE.

Variation in the Sun's Position at Different Seasons of the Year.—J. A. C. Branfil. (1903, p. 1176.)

Points of the Compass at which the Sun rises for London, Edinburgh and Dublin. (1869, p. 147.)

Sun's Altitude for various Latitudes. 1898, p. 1063.)

Exposure and Lens Aperture. (1910, p. 893.)

Actinograph Exposure Table. (1901, p. 702.)

Comparative Exposures.—W. K. Burton. (1887, p. 341.)

Comparative Plate-Speed Numbers (1912, p. 897.)

ORTHOCHROMATIC.

Speeds and Colour Sensitiveness of Various Plates to Different Lights.—Eder. (1907, p. 1115.)

Wave-Lengths of the Principal Fraunhofer Spectrum Lines, and the Elements that give them. (1905, p. 1144.)

Reflection of Light from various Surfaces. (1900, p. 1016.)

OPTICAL.

Equations relating to Foci, etc.—Branfil. (1907, p. 1120.)

Combining Lenses.—Formulæ. (1910, p. 893.)

Perspective—Factors. (1910, p. 895.)

Correction of Convergent Distortion.—Formulæ. (1910, p. 896.)

Scale of Image. (1910, p. 893.)

Conjugate Foci. (1910, p. 892.)

Royal Photographic Society's Standard Diaphragms. (1903, p. 1178; 1905, p. 1149 and 1907, p. 1093.)

Uniform System Numbers for Stops from f/1 to f/100. (1905, p. 1147.)

Continental Stops and their U.S. Equivalents. (1907, p. 1127.)

Correction for Inconstancy of Aperture. (1910, p. 895.)

Angles and Foci of the Telephoto Lens. (1894, p. 949.)

Steinheil's Tables of Camera Extensions, etc., corresponding to a given Magnification of the Telephoto Lens. (1902, p. 732.)

Focussing with Pinhole Appertures. (1896, p. 954.)

Aperture Markings of Old Lenses. (1927, p 457.)

View Angles. (1927, p. 458-459.)

MISCELLANEOUS INFORMATION.

Copyright in Photographs.

The law of the reproduction of photographs is now governed by the Copyright Act, 1911, which came into force (in Great Britain) July 1, 1912.

Copyright is automatically created by the taking of the photograph. Registration of copyright is abolished.

Copyright in a photograph lasts for fifty years from the making of the negative.

Existing copyright photographs (made before July 1, 1912) obtain the full protection of copyright granted by the 1911 Act. They obtain this whether registered or not under the old Act.

The copyright belongs to the author unless first made "to the order" of some other person for a valuable consideration, in which case it belongs to the person giving the order.

The author is defined by the Act to be the owner of the negative when it was made.

A sitter who has his photograph taken by a photographer in the ordinary course, thereby obtains the copyright in it. The photographer does not obtain the copyright by making a reduced charge, etc., unless the copyright is assigned to him in writing. If, however, the photographer invites a sitter to be photographed, without there being any obligation for the sitter to pay for the photographs, the photographer automatically becomes the owner of the copyright, even though he may afterwards sell copies of the photographs to the sitter.

The copyright belongs to the sitter who orders in the ordinary way, even though he (the sitter) may not pay for the photographs.

It is not necessary to mark photographs "copyright" when circulating them to newspapers, offering them for reproduction, but it is advisable to do so.

It is an infringement of copyright to reproduce a photograph without permission, and also to sell or offer for sale photographs which have been so made without the permission of the owner of the copyright. A photographer whose photographs have been infringed is therefore entitled to take action against both the actual infringer and also against shopkeepers and others who may be handling publications containing the infringing copies.

By taking action the photographer may obtain damages, and also injunctions for delivery to him of the infringing copies, and of any printing blocks or

plates used in their production. When it can be shown that infringement has been done knowingly, the infringer is liable to summary penalties in the shape of fines or even imprisonment.

Infringing copies may be prevented from importation into the United Kingdom by notice to the Customs Commissioners.

The Act provides for copyright in cinematograph films, and permits photographs to be taken of copyright architectural works of art (buildings); and also of sculpture which is situated in a public place. Such photographing is not an infringement of the copyright in the architecture or sculpture.

In accordance with certain unrepealed clauses of the Copyright Act of 1862 it is an offence against the photographer for his work to be fraudulently issued with a false name or marking, or to be exhibited or sold falsely marked. Copies of photographs may not be issued as having been made by the original author, and a photograph in which unauthorised alterations have been made must not be issued as the unaltered work of the author.

Reproduction Fees.

The following are the fees for the reproduction of photographs currently paid by newspapers in London and the provinces.

London daily papers and London Sunday papers: 17s. 6d. for any size less than 30 sq. ins.; above this, 30s. up to 60 sq. ins.; 60s. up to 90 sq. ins.; over 90 sq. ins., 100s.

London weekly papers: 10s. 6d. up to 3 sq. ins.; 14s. up to 12 sq. ins.; 17s. 6d. up to 30 sq. ins.; 50s. up to 90 sq. ins.; over 90 sq. ins., 90s.

Provincial dailies, Sunday and local papers: from 1 sq. in. to 3 sq. ins., 10s. 6d.; up to 24 sq. ins., 14s.; above 24 sq. ins., 28s.

The Shops Acts.

(*Great Britain.*)

Under the Shops Acts of 1911 and 1912, the parts of a photographer's premises in which goods are sold to the public is a "shop." As such, it must be closed one half-day in each week from 1 p.m. unless exempted on certain grounds.

It has, however, been held that a photographer may admit sitters to his establishment on the weekly half-holiday by previous appointment, but must not keep the "shop" open so that chance passers-by may enter.

In holiday resorts the half-day closing each week may be suspended for the whole or part of the season.

Assistants in a "shop," that is to say receptionists and others who take orders from customers, or despatch goods, are entitled under the Act each week to one half-day holiday beginning not later than 1.30. The half-holiday may be on the half-day closing day or on another day of the week. The employer is required to put up a notice in his shop stating the days when his assistants are to have their half-holiday.

In holiday resorts in which an Order allowing shops to keep open during the holiday

season on the weekly half-holiday is in force, an employer who satisfies the local authority that he gives his assistants a holiday on full pay of not less than two weeks during the year and posts a notice to that effect in his shop, need not give his assistants a half-holiday during the time the Order is in operation.

The Shops Acts are administered by local authorities: applications for information on particular points should be addressed to the town council, urban or rural council in the photographer's district.

Registration of Business Names.

Under the Registration of Business Names Act, 1916, it is required that persons who carry on a business in Great Britain under a name which is not their true name or the name by which they have always been known shall register the business with the Registrar of Business Names and shall comply with certain regulations prescribed by the Act.

Under the Act it is required that a person or partnership shall register if the "business name" includes any addition to the name of the person or names of partners. Thus Joseph Jones need not register if he trades as "Jones" or as "J. Jones", but if he trades as "Jones & Co." he must register. Similarly two partners, J. Jones and F. Jones, are required to register if trading as "Jones Bros."

The Act applies to those of British nationality as well as to aliens.

Also every individual or firm who, or a member of which, has either before or after the passing of the Act changed his name is required to register. But this provision does not apply to a woman who has changed her name by marriage.

The cost of registration is 5s. Offices of the Registrars are: England and Wales, Somerset House, W.C.2; Scotland, Exchequer Chambers, Parliament Square, Edinburgh; Ireland, Coleraine House, Dublin.

Registered firms are required to exhibit the certificate of registration in a conspicuous place in their premises.

Registered firms are also required to state in legible characters in all trade catalogues, trade circulars, show cards and business letters, on which the business name appears, the present christian name, or initial and present surname of the individual proprietor; and those of all partners, in the case of businesses belonging to more than one person.

If the individual proprietor or partners are not of British nationality, the nationality must also be stated on such business stationery; and if there has been a change of nationality, the original nationality must also be stated.

Fines not exceeding £5 may be inflicted for failure to register, or non-observance of the provisions relating to publication of names or nationality.

Photographers who come within the Act are not required to publish their true name on the photographs, postcards, etc., which they supply.

Exhibitions.

Under this heading will be found particulars of the chief exhibitions of photography to be held during 1929. For all the exhibitions, work is invited from photographers in all parts of the world.

Royal Photographic Society.

The annual exhibition of the Society is held from about the middle of September to the end of October. Entries must be received by about the middle of August. The exhibition comprises pictorial prints and also pictorial lantern slides and colour transparencies and prints. It also includes a considerable number of technical sections representing photographic work in natural history, astronomy, photo-micrography, cinematography and radiography (X-rays); technical examples of colour photography and of stereoscopic photography are also invited, as are also prints showing special applications of photography. Prospectus and entry form from the Secretary, 35, Russell Square, London.

Northern.

This exhibition is most frequently held in either Manchester or Liverpool; sometimes in other centres in the north of England. It is chiefly pictorial in its scope, but as a rule also includes lantern slides and colour transparencies and also examples of natural history and scientific photography. Application for the prospectus should be made to the Secretary of either the Liverpool Amateur Photographic Association or the Manchester Amateur Photographic Society. See under "Societies" later in these pages.

London Salon.

Exclusively an exhibition of pictorial prints. It is held from about mid-September to mid-October. The latest time for the receipt of prints is about the end of August. Prospectus and entry form of the Secretary, 5A, Pall Mall East, London.

Scottish Salon.

This exhibition is usually held in February and at a different town or city in Scotland each year. It is almost exclusively pictorial in scope, and exhibitors are limited to those of Scottish nationality and to photographers resident in Scotland. The exhibition is promoted by the Scottish Photographic Federation.

Midland Salon.

Chiefly pictorial. Sept. or Oct., 1929. Promoted by the Midland Counties Federation. Secretary, J. S. Lancaster, 144, Middleton Hall Road, Birmingham.

Paris Salon.

An exhibition which is exclusively pictorial is held in October each year at the house of the French Photographic Society, 51, Rue de Clichy, Paris. Prints should reach the organisers by about the end of August.

An international exhibition is also held in August-September by the Toronto Camera Club; and in Australia a group of pictorialists now organises an annual salon. Inquiries to Mr. J. G. McColl, Box 298, G.P.O., Sydney.

Text-Books.

Those of the books in the following list which are still in print are obtainable by order from all photographic dealers. But a very large number are now out of print, though obtainable, in many cases, from dealers in second-hand books.

Elementary and General.

First Aid to the Amateur Photographer. Will R. Rose. 2s. 6d.
Amateur Photography. F. T. Beeson and A. Williams. 2s. 6d.
Photography Made Easy. R. Child Bayley. 3s.
Ilford Manual of Photography. C. H. Bothamley. 1s. 6d.
Sinclair Handbook of Photography. 1s. 6d.
All about Photography. P. R. Salmon. 2s. 6d.
Barnet Book of Photography. 3s.
The Photographic Instructor. J. I. Pigg. 4s.
A Primer of Photography. Capt. Owen Wheeler. 3s. 6d.
Photographic Technique. L. G. Hibbert. 2s. 6d.
Early Work in Photography. W. Ethelbert Henry. 1s. 6d.
Photography: Principles and Practice. C. B. Neblette. 30s.
Science and Practice of Photography. Chapman Jones. 6s.
Instruction in Photography. W. de W. Abney. 7s. 6d.
Dictionary of Photography. E. J. Wall. 10s. 6d.
Cyclopædia of Photography. Ed. Bernard E. Jones.
The Complete Photographer. R. Child Bayley. 15s.
Photography: Principles and Applications. A. Watkins. 10s. 6d.
Photography as a Business. Arthur G. Willis. 5s.
Photography as a Scientific Implement. 30s.
Photography of To-day. H. Chapman Jones. 6s.
The Marvels of Photography. Charles R. Gibson. 5s.
The Camera as Historian. H. D. Gower, L. Stanley Jast, and W. W. Topley. 6s.

Optics and Chemistry.

Fundamentals of Photography. C. E. K. Mees. 4s.
Photographic Lenses. Conrad Beck and Herbert Andrews. 1s.
The Optics of Photography and Photographic Lenses. J. Traill Taylor. 3s. 6d.
Camera Lenses. A. Lockett. 2s. 6d.
Soft-focus Lenses. (No. 184 of *Photo-Miniature.*)
Modern Telephotography. Capt. Owen Wheeler. 1s. 6d.
Telephotography. C. F. Lan-Davis. 3s. 6d.
Photographic Chemicals and Chemistry. T. L. J. Bentley and J. Southworth. 3s. 6d.
The Chemistry of Photography. R. Meldola. 6s.
Photographic Researches of Hurter and Driffield. W. B. Ferguson. 25s.

Special Branches.

Commercial Photography. D. Charles. 5s.
Complete Press Photographer. Bell R. Bell. 6s.
The Real Pictorialism. F. C. Tilney. 1s.
Appeal of the Picture. F. C. Tilney. 7s. 6d.
The Hands in Portraiture. (No. 172 of *Photo-Miniature.*)
Picture-making by Photography. H. P. Robinson. 2s. 6d.
Photography on Tour. 6d.
Lighting in Portraiture. Herbert Lambert. (In the Press.)
Towles' Portrait Lightings. Will H. Towles. 21s.

The Portrait Studio. Practicus of the *B.J.* 1s.
Studio Construction. (No. 182 of *Photo-Miniature.*)
Portraiture, Parts I and II. F. C. Tilney. 1s. each.
Sketch Portraiture. R. Spencer Adamson. 9d.
The Photographic Studio. T. Bolas. 2s.
Lighting in Photographic Studios. P. C. Duchochois. 1s. 6d.
The Studio, and what to do in it. H. P. Robinson. 3s. 6d.
Commercial Photography. Practicus. 1s.
Flashlight. J. J. Curtis. 1s.
Magnesium Light Photography. F. J. Mortimer. 1s. 6d.
Reflex Cameras. (No. 151 of *Photo-Miniature.*)
Photography of Moving Objects and Hand-camera work for Advanced Workers. Adolphe Abrahams. 1s. 6d.
How to Make Good Pictures. (Kodak.) 2s.
Copying Methods. (No. 156 of *Photo-Miniature.*)
Stereoscopic Photography. A. W. Judge. 15s.
Photo-micrography. E. J. Spitta. 12s.
Handbook of Photo-micrography. H. Lloyd Hind and W. Brough Randles. 7s. 6d.
Airplane Photography. H. E. Ives. 18s.
Photographs for the Papers. John Everard. 2s. 6d.
Free-lance Journalism with a Camera. R. H. Mallinson. 2s. 6d.

Negative Processes.

The Wet Collodion Process. Arthur Payne. 3s.
Collodion Emulsion. H. O. Klein. 5s.
Perfect Negatives. Dr. B. T. J. Glover. 1s.
The Photography of Coloured Objects. C. E. K. Mees, 2s. 6d.
Photographic Rendering of Colour in Monochrome. B. T. J. Glover. 1s.
The Watkins Manual (of exposure and development). Alfred Watkins. 1s. 3d.
Intensification and Reduction. H. W. Bennett. 1s. 6d.
Retouching and Finishing for Photographers. J. Spencer Adamson. 4s.
Art of Retouching Negatives and Finishing and Colouring Photographs. T. S. Bruce and Alfred Braithwaite. 5s.

Printing Processes.

Print Perfection. Dr. B. T. J. Glover. 1s.
Toning Bromide Prints. R. Blake Smith. 1s. 6d.
Photographic Enlarging. R. Child Bayley. 3s. 6d.
A B C Guide to Autotype Permanent Photography. J. R. Sawyer. 1s. 6d.
Carbon Printing. E. J. Wall. 1s. 6d.
Bromoil Printing and Transfer. Dr. E. Mayer. $2·50.
Bromoil and Oil Prints. Jas. A. Sinclair. 2s.
The Art of Pigmenting. Bertram Cox and F. C. Tilney. 1s.
Oil, Bromoil and Transfer. Fred. Judge and F. C. Tilney. 1s.
Expression in Pigmenting. F. C. Tilney. 1s.
Oil and Bromoil Processes. F. J. Mortimer and S. L. Coulthurst. 1s. 6d.
Oil and Bromoil Printing. (No 106 of *Photo-Miniature.*)
Perfection in the Pigment Processes. Chris. J. Symes. 1s.
Platinotype. W. de W. Abney and Lyonel Clark. 2s. 6d.
Kallitype Processes. (No. 185 of *Photo-Miniature.*)

Blue Printing and Modern Plan Copying. B. J. Hall. 6s.
Photographic Enamels. René d'Heliecourt. 1s. 6d.
Trimming, Mounting and Framing. (No. 102 of *Photo-Miniature.*)
Air-brush Technique. (No. 181 of *Photo-Miniature.*)

Lantern and Cinematograph.

Optical Projection. R. S. Wright. 4s. 6d.
Lantern Slides. B. T. J. Glover. 1s.
Practical Slide-making. G. T. Harris. 1s. 6d.
Living Pictures. R. B. Foster. B.Sc. 6s.
The Guide to Kinematography. Colin N. Bennett. 10s. 6d.
Amateur Cinematography. Capt. Owen Wheeler. 5s.

Process Work.

Ilford Manual of Process Work. L. P. Clerc. 7s. 6d.
Horgan's Half-tone and Photo-mechanical Processes. S. H. Horgan. 12s. 6d.
Half-tone process on the American Basis. Wm. Cronenberg. 2s.
Photo-mechanical Processes. W. T. Wilkinson. 4s.
Elements of Photogravure. C. N. Bennett. 5s.

Colour Photography.

Practical Colour Photography. E. J. Wall. 12s. 6d.
Photography in Colours. Dr. Lindsay Johnson. 7s. 6d.
Three-colour Photography. A. von Hubl. 7s. 6d.
Natural-colour Photography. Dr. E. Kõnig. 3s.
Bye-Paths of Colour Photography. "O. Reg." 5s.
Colour Photography. Capt Owen Wheeler. 12s. 6d.
Colour and Methods of Colour Reproduction. R. C. Martin and W. Gamble. 12s. 6d.
The History of Three-Colour Photography. E. J. Wall. $15.

Trade Booklets.

The following booklets of technical information are issued by the undermentioned firms in the photographic trade. Except where otherwise stated, the booklets are sent post free to any applicant.

Adhesive Dry-Mounting Co.

Dry-Mounting.

Agfa, Ltd.

Flashlight Photography.
Roll-film Photography.
Process Plates.
Rodinal Developer.
Agfa Colour Plates.
X-Ray Photography.

Aldis Bros.

The Aldis Lens Book.
Soft-focus with Aldis Lenses.
Lenses for Enlarging.

Ansco, Ltd.

Cyko Manual and Film Booklet.

Apem, Ltd.

Marion's Plates.
Paget Plates.
Paget Self-toning Paper.
Rajar Roll Films.
Gaslight Printing. By R. R. Rawkins.
Home Portraiture By P. R. Salmon.

Autotype Co., Ltd.

More Profit from Portraiture.
First steps in Autotype Printing.
Rotary Gravure Tissues (in English, French and German).
Trichrome Tissues.
Carbro Process.

Burroughs Wellcome & Co.

How to Improve Photographs.
Toners and Stains.
Warm Tones on Lantern Slides.
Time Development in Film Tanks.

Criterion, Ltd.

Art and Practice of Photography (9d.)

J. H. Dallmeyer, Ltd.

Why a Telephoto ?
Hints on Cameras and Lenses.
Lenses for Amateur Cinematography.

Dennison Mfg. Co.

Passe-Partout Framing.

Elliot & Sons, Ltd.

How to make Snapshots that Sell (3d.).

Gem Dry Plate Co., Ltd.

Gem Roll-films.
Photo-micrography with Gem Plates.

Gevaert, Ltd.

Artos Paper.
Self-toning Paper.
Gaslight Papers.
Bromoil.
X-ray Photography.

Grant, Thos. K.

Autochrome Plates.
Lumière Plates, Films, etc.

Houghton-Butcher, Ltd.

Enlarging with the Autoprint.

Ilford, Ltd.

Ilford Plates and Films. (Exposure, Developing, Intensification, etc.)
Ilford Exposure Tables.
Snapshot Work.
Panchromatism (8d. post free).
Ilford Colour Filters.
Certinal Development.
Desensitol.
Printing on P.O.P. and Self-Toning Paper.
Bromide, Bromoil and Gaslight Papers.
Lantern Slides on Dry Plates.
Ilford X-ray Plates and Films.

Illingworth & Co., Ltd.

Guide to Photographic Printing and Roll-film and Plate Photography.
Camera Snaps.
The Enitone Way (Self-toning).
Enlarging and Printing.
Gaslight Printing.
Red Label Zona.
Panchromatics for All. By David Charles. (1s.).

Imperial Dry Plate Co., Ltd.

Imperial Handbook.
Developers and Development.
Development by Time and Temperature.
Lantern Plates.
Faults in Negatives.
Panchromatic Film-Packs.
Impan (panchromatic) Films.
Imperial Safelights.
Imperial Roll-Film.
Imperial Plates for Process Work.
Negative Paper.
Imperial Colour Filters.
Imperial X-ray Screen Booklet.
Radio-Metallography.
Collodone Paper.

Johnson Matthey & Co.

Economy in Toning.
Memoranda for Manufacturers.

Johnson & Sons.

Time development (Azol and Vedol).
Flashlight Photography.
Winter Photography.

Kodak, Ltd.

Amateur Flashlight.
Tinting in Oil-colours.
Modern Dark Room Illumination.
Kodak Cut Film.
Transferotype Paper.
Real Orthochromatism.
Colour Films, Plates and Filters.
Photographing Paintings (3d.)
Photo-Micrography (6d.).
Process Work with Dry Plates.
How to make good pictures (1/-.)

Kosmos Photographics, Ltd.

Vitegas Printing Self-toning Paper.

Vanguard Co.

Varnishing Negatives Made Easy
Firelight Portraits by Daylight.

Glazing Photographic Prints.
Colouring Prints and Slides.
Intensification and Reduction.
Revolution in Retouching.
Saving Over-printed Bromides.

Wellington & Ward, Ltd.

Wellington Handbook (1s.). Also in French, Danish, Spanish and Portuguese.
Negative Making.
Wellington Bromide Paper.
Mezzotint Paper.
Wellington Bromoil Paper.
Wellington S.C.P.
Wellington Film.
Seltona for Beautiful Prints.
Spectrum Plates.

Zeiss, Carl.

The Choice of a Lens.
How Lenses are Made.
Proxar and Distar Lenses.
Ultra-Rapid Lenses.
Zeiss-Ikon Co. Exposure Tables.

Permits to Photograph.

London Area.

Westminster Abbey.—From the Chapter Clerk, the Sanctuary, Westminster. Permission is rarely given. A fee of 5s. is required for each photograph.

St. Paul's Cathedral.—From the Dean's Verger. Fee, 2s. 6d. per day.

Tower of London.—From the Resident Governor.

Houses of Parliament.—From the Secretary, Lord Chamberlain's Office, House of Lords.

Guildhall.—From the City Surveyor, Guildhall, E.C. 2

Public Record Office.—By application at the time in the Literary Research Room, Public Record Office, Chancery Lane, W.C 2.

Picture Galleries (National Gallery, Tate Gallery).—Permission given only to professional photographers.

British Museum.—Special permission granted for use of stand cameras only by application in writing to the Director.

Victoria and Albert Museum.—From the Director and Secretary, South Kensington, S.W.7. There are special restrictions.

Bethnal Green Museum.—From the Director and Secretary, Victoria and Albert Museum, South Kensington, S.W. 7.

Zoological Gardens.—A fee of 2s. 6d. is charged for permission to use stand cameras or hand cameras larger than quarter-plate. Application to the Secretary.

Royal Parks.—No permission required for use of hand cameras, provided that portraits or groups are not taken. For stand cameras, permission requires to be obtained from the Secretary, H.M. Office of Works, Storey's Gate, Westminster, S.W. 1. This applies to Hyde Park, Green Park, St. James' Park, Primrose Hill, Regent's Park, Greenwich Park, Richmond Park, Bushey Park and Hampton Court Park, Gardens and Green.

Other Parks.—Almost all other Parks in the London area are under the control of the L.C.C. Permits to use stand cameras on application to the Chief Officer, Parks Department, The County Hall, Westminster Bridge, S.E. 1.

Kew Gardens.—On payment of 3d. in addition to charge for admission.

Burnham Beeches.—From the Town Clerk, Guildhall, E.C. 2

Windsor Great Park and Virginia Water.—From Col. Hon. Claude Willoughby, Deputy Ranger, Holly Grove, Windsor Park.

Epping Forest and Wanstead Park.—From the Town Clerk, Guildhall, E.C. 2.

Provinces.

Cathedrals.—Permission to use a camera in English Cathedrals is obtainable on application, in the great majority of cases, to the Dean. In some few instances no fee is charged.

Photographic Periodicals.

Abel's Photographic Weekly, 515, Caxton Building, Cleveland, Ohio, U.S.A.

Amateur Photographer and Cinematographer, Iliffe & Sons, Ltd., 20, Tudor Street, London, E.C. 4.

American Annual of Photography, 428, Newbury Street, Boston 17, Mass., U.S.A.

American Photography, 428, Newbury Street, Boston 17, Mass., U.S.A.

Art Photographique, Rue Markelbach, 152, Brussels.

Atelier, W. Knapp, Mühlweg, 19, Halle a/Saale, Germany.

Australasian Photo-Review, Kodak (Australasia), Ltd., 379, George Street, Sydney, Australia.

British Journal of Photography, Henry Greenwood & Co., Ltd., 24, Wellington Street, Strand, London, W.C. 2.

British Journal Photographic Almanac, Henry Greenwood & Co., Ltd., 24, Wellington Street, Strand, London, W.C.

Bulletin de l'Association Belge de Photographie, Ch. Puttemans, Palais du Midi, Brussels.

Bulletin de la Société Française de Photographie, 51, Rue de Clichy, Paris, IX.

Bulletin of Photography, 636, Franklin Square (Cor. 7th and Race Streets), Philadelphia, U.S.A.

Camera, 636, Franklin Square (Cor. 7th and Race Streets), Philadelphia, U.S.A.

Camera, C. J. Bucher A.-G., Lucerne, Switzerland.

Camera, 2, Crow Street, Dublin.

Camera Craft, 413/415, Claus Spreckels Building, San Francisco, Cal., U.S.A.

Chemistry & Industry, Central House, Finsbury Square, London, E.C. 2.

Commercial Photographer, Abel's Publishing Co., 515, Caxton Building, Cleveland, Ohio, U.S.A.

Correo Fotografico, Maipu 231, Buenos Aires, Argentine Republic.

Corrière Fotografico, 6, Via Stampatori, Turin, Italy.

Focus, Bloemendaal, Holland.

Foto Revista, Alsina 974, Buenos Aires, Argentine Republic.

Fotograph Polski Ul. Czackiego 3/5, Warsaw.

Jahrbuch für Photographie und Reproduktionstechnik, W. Knapp, Halle a/S., Germany.

Journal of the Camera Club, 17, John Street, Adelphi, London, W.C. 2.

Journal of the Photographic Society of India, 229, Lower Circular Road, Calcutta, India.

Kodak Magazine, Kodak, Ltd., Kingsway, London, W.C. 2.

Lichtbild, Verlag Josef F. Rimpler, Haida-Böhmen, Czechoslovakia.

Linse, Derfflingerstrasse 23, Berlin—Lankwitz.

Monthly Abstract Bulletin, Research Laboratory, Eastman Kodak Co., Rochester, N.Y., U.S.A.

New Photographer, amalgamated with the Amateur Photographer and Cinematographer.

Nouvelles Photographiques, 3, Rue Rossini, Paris.

Oesterreichische Photographen Zeitung, Oesterreicher Photographen - Verein, Vienna III/I.

Optician, Gutenberg Press, Ltd., 123, 124 & 125, Fleet Street, London, E.C.

P.P.A. Record, Professional Photographers' Association, 8, Breams Buildings, Chancery Lane, London, E.C.

Photo-Era, Wolfeboro, New Hampshire, U.S.A.

Photokunst, Dambruggestreet 265, Antwerp.

Photo-Markt, Nordbahnstrasse 14, Vienna.

Photo-Miniature, 70, Fifth Avenue, New York, U.S.A.

Photo Pour Tous, 37, Rue Lafayette, Paris-Opera.

Photo-Pratique, 3, Rue Rossini, Paris.

Photo-Revue, 118, Rue d'Assas, Paris VI.

Photo-Woche, Lindenstrasse 26, Berlin.

Photofreund, Lindenstrasse 26, Berlin.

Photograph, L. Fernbach, Bunzlau.

Photographe, 189, Rue St. Jacques, Paris XIV.

Photographic Abstracts, Royal Photographic Society, 35, Russell Square, London, W.C. 1.

Photographic Dealer, Sicilian House, Southampton Row, London, W.C.

Photographic Journal, Harrison & Sons, 45, St. Martin's Lane, London, W.C., for the Royal Photographic Society.

Photographische Chronik, W. Knapp, Halle a/Saale, Germany.

Photographische Industrie, Krausenstr. 35/36, Berlin, S.W. 19, Germany.

Photographische Korrespondenz, Schottengasse 4, Vienna I., Austria.

Photographische Rundschau 19, Mühlweg, Halle a/S., Germany.

Photographie für Alle, Krausenstrasse 35-36, Berlin, S.W. 19.

Polski Przeglad, Fotofraficzny, Kasimierz Greger, ul 27, Grudnia 20, Poznan, Poland.

Procédé, 150, Boulevard de Montparnasse, Paris, XIV.

Process Engravers' Monthly, 12, Farringdon Avenue, London, E.C. 4.

Progresso Fotografico, R. Namias, Parco Mirabello, Milan, Italy.

Revue d'Optique, 3-5, Boulevard Pasteur, Paris, XVe.

Revue Française de Photographie, 189, Rue St. Jacques, Paris, XIV.

Science, Technique et Industries Photographiques, Paul Montel, 189, Rue Saint-Jacques, Paris, XIV.

Snapshots, Sicilian House, Sicilian Avenue, London, W.C. 1.

Valokuvaus, Aleksanterinkatu 38, Helsinki Suomi, Finland.

Zeitschrift für Wissenschaftliche Photographie, J. A. Barth, 16, Dörrienstrasse, Leipzig, Germany.

Contractions.

The following is a list of the contracted descriptions most commonly occurring in photographic literature, catalogues of photographic requisites and advertisements in photographic journals. Especially to those in foreign countries it is thought that the meaning of these various contracted descriptions will be of service.

B.—mark on exposure shutters, signifying "bulb," that is, setting of the shutter at which shutter remains open as long as the release is pressed.

B. & W.—black and white. Used in description of photographs worked up (in black) with crayon, air-brush, or other method.

B.P.—British Pharmacopœia. Indicates standard of strength and purity of chemicals.

C.—Centigrade. Degree of temperature.

C.C.—collodio-chloride printing paper.

c.c.—cubic centimetre, metric measure of volume. About 17 minims.

C. de V.—carte de visite, an early size—about $3\frac{1}{4} \times 2\frac{1}{4}$ inches—of portrait photograph.

Cent.—Centigrade. See C. above.

c.p.—candle power.

C.P.—chemically pure. Trade description of chemicals.

cryst.—crystallised. Indicates the crystallised form of any chemical as distinguished from the dry or anhydrous form.

D. & E.—day and electric. Used in reference to portrait studios.

D.O.P.—Developing-out paper. Term used in United States for gaslight papers.

D. & P.—developing and printing. The term is understood to mean the commercial quantity development of roll-film and the making of prints from the resulting negatives. In United States the corresponding description is "Photo-Finishing."

E.H.—Eder-Hecht. Designation of plate speed used in Germany.

F.—Fahr. or Fahrenheit. Degree of temperature.

F.P.—focal-plane (shutter).

F.P. adapter.—film-pack adapter. Frame for using a film-pack on a plate camera.

H. & D.—Hurter and Driffield. Designation of speed of plates.

I.—instantaneous. Marking on shutters indicating that at this setting the shutter gives one or other of the instantaneous (snapshot) exposures.

M.—moment. Marking on shutters of German manufacture, indicating that at this setting the shutter gives one or other of the instantaneous exposures.

mm.—millimetre. 100 mm. equal 4 inches, very nearly.

M.Q.—metol-hydroquinone.

O.—offen. Marking on shutters of German manufacture equivalent to B, which see.

P.C.—postcard. In reference to cameras, plates and printing papers denotes a size of $3\frac{1}{2} \times 5\frac{1}{2}$ inches.

P.O.P.—printing-out paper. Contraction first used (in Britain) for gelatino-chloride print-out paper.

P.S.—plate sunk (mounts).

q.s.—quant. suff. In formulæ, denotes that sufficient of the chemical is to be used to produce a particular effect.

sp. gr.—specific gravity. Weight in comparison with an equal bulk of water.

T.—time. Marking on shutters denoting that at this setting the shutter opens on pressing the release and remains open until the release is again pressed.

U.S.—uniform system. A system of diaphragm markings according to which $f/4$ is 1, $f/5{\cdot}6$ is 2, $f/8$ is 4, and so on.

V.P.—vest pocket. Size of camera. Generally understood to indicate a camera taking a picture 45 × 60 mm. in size = $1\frac{3}{4} \times 2\frac{3}{8}$ inches.

W.A.—wide angle (lens).

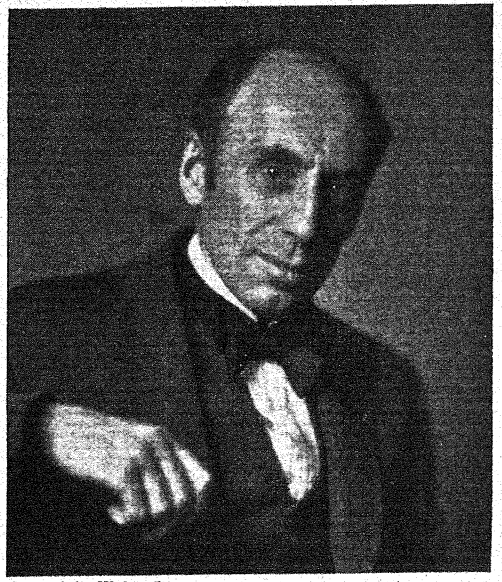
W.Y.W.—while-you-wait. Applied to portrait studios and also to cameras such as those used in beach photography for making ferrotype and similar portraits.

Z.—zeit. Marking on shutters of German manufacture. It is equivalent to T, which see.



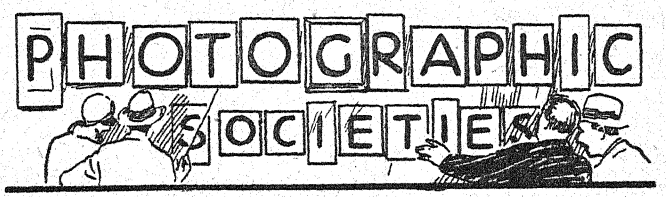
Portrait by A. C. Banfield.

F. F. RENWICK, A.C.G.I., F.I.C.
President, Royal Photographic Society.



Portrait by Walter Thomas.

ANGUS BASIL.
President, Professional Photographers' Association.



Societies in Great Britain

(Including Northern Ireland).

The following list has been compiled from data supplied by their respective secretaries. * Societies marked with an asterisk are affiliated to the Royal Photographic Society, Great Britain.

Royal Photographic Society of Great Britain.

FOUNDED 1853.

Anyone who is interested in either the science or the art of photography, as an amateur or a professional, is eligible for membership.

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Abbreviations.—C.C., Camera Club; P.C., Photographic Club; P.S., Photographic Society.

***Aberdeen Photographic Association.**—*Pres.*, John H. Taylor. *Meetings*, 154, Union Street, Tuesdays, 8 p.m. *Sec.*, Hilda M. Bailey, 63, Watson Street, Aberdeen.

Aberdeen Photo. Art Club.—*Pres.*, Wm. Maitland. *Meetings*, 220, Union Street, Thursdays, 7.30 p.m. *Sec.*, Wm. Duncan, 67, Bonacord Street, Aberdeen.

Abertillery and District P.S.—*Meetings*, 7, Rosebery Street, Abertillery, Tuesdays, 7.30 p.m., *Sec.*, W. A. Bolingbroke, Marlborough Road.

***Accrington C.C.**—*Pres.*, J. Threlfall. *Meetings*, Union Bank Chambers, Blackburn Road. Wednesdays, 7.45. *Sec.*, G. F. Bolton, 81, Spring Hill Road, Accrington.

Accrington.—Wesley C.C.—*Pres.*, H. Oldham. *Meetings*, Wesley School, Abbey Street. *Sec.*, J. Hart, 140, Bold Street, Accrington.

***Airdrie.—Monklands P. S.**—*Pres.*, W. S. Culbert. *Meetings*, Studio, Victoria Place, Tuesdays, 7.45 p.m., October to March. *Sec.*, Wm. Blair, 38, Stirling Street, Airdrie.

***Altrincham.—St. Margaret's Church Institute Amateur Photographic Society.**—*Pres.*, C. Lawton-Jones. *Meetings*, St. Margaret's Church Institute, Mondays, 8 p.m. *Sec.*, Mrs. A. Lawton-Jones, Kilrea, Market Street, Altrincham.

Amateur Cinematographers' Association.—*Sec.*, T. J. Wilson, 59, Old Bailey, London, E.C. 4.

Arbroath Y.M.C.A. C.C.—*Pres.*, R. C. Brown, *Meetings*, Y.M.C.A. Buildings, High Street, Second and Fourth Fridays, 7.30 p.m. *Sec.*, John K. Ritchie, 3, West Mary Street, Arbroath.

Armley and Wortley P.S.—*Pres.*, W. O. Walker. *Meetings*, West Leeds High School, Armley, Thursdays 7.45 p.m. *Sec.*, J. Page, 38, St. Ives Mount, Armley, Leeds.

Ashton-under-Lyne P.S.—*Pres.*, Councillor S. A. Platt. *Meetings*, 11, Fleet Street, Thursdays, 8.15 p.m. *Sec.*, George J. Brown, 4, Sugden Street, Ashton-under-Lyne.

Ayr Amateur P.S.—*Pres.*, A. J. Oliver. *Meetings*, 16, New Bridge Street. Thursdays, 8 p.m. *Sec.*, Wm. Stewart, 7, Fothringham Road, Ayr.

Bacup Naturalists' C.C.—*Pres.*, Mrs. W. Madeley. *Meetings*, Todmorden Road, Tuesdays. *Sec.*, John Henry Heys, 2, Farholme Lane, Stacksteads, Lancs.

Barnard Castle and District P.S.—*Meetings*, Witham Hall, First and Third Fridays, 7.30 p.m. *Sec.*, E. Holdsworth, Mason's Pharmacy, Barnard Castle.

Barnsley P.S.—*Pres.*, T. M. Fowler, *Meetings*, The Studio, Shambles Street, Tuesday, 7.30 p.m. *Sec.*, G. F. Kaye, 6, Chilton Street, Barnsley.

Barrow Naturalists' Field Club (Photographic Section).—*Pres.*, Rev. F. Ashburner, M.A. *Meetings*, Alternate Mondays, Technical Schools, 7.45 p.m. *Sec.*, W. Diamond, 162, Park Avenue.

***Barry C.C.**—*Meetings*, Y.M.C.A., Barry, Fridays, 8 p.m. *Sec.*, T. J. Edwards, 44, Tynewydd Road, Barry, Glam.

Bath and County C.C.—*Meetings*, 10a, Vineyards, First and Alternate Thursdays, 7.45 p.m. *Sec.*, Francis H. Gray, Vine House, Weston, Bath.

***Battersea Men's Institute C. C.**—*Pres.*, J. P. Thomas. *Meetings*, Battersea County School, Lavender Hill, Tuesdays and Wednesdays, 7.45. *Sec.*, W. J. Hiles, 60, Park Grove, Battersea, S.W.11.

***Battersea Polytechnic C.C.**—*Pres.*, G. F. O'Riordan, B.Sc. *Sec.*, G. M. Thomas, Battersea Polytechnic, Battersea, London, S.W. 11.

***Beckenham P.S.**—*Pres.*, H. F. Joel. *Meetings*, Art School, Tuesdays, 7.30 p.m., October to April. *Sec.*, A. J. E. Mayor, 12, Westfield Road, Beckenham.

***Bedford C.C.**—*Pres.*, H. P. Emsley. *Meetings*, Newnham Rooms, St. Cuthbert Street, Alternate Tuesdays, 8 p.m. *Sec.*, G. J. White, 4, The Broadway, Bedford.

***Belfast Central Presbyterian C.C.**—*Pres.*, J. Small, D.Sc. *Meetings*, Assembly Buildings, Howard Street, Second Tuesdays, 8 p.m., from October to April *Sec.*, R. A. Black, 21, Landscape Terrace, Crumber Road, Belfast.

Belfast City Y.M.C.A. C.C.—*Pres.*, S. A. Nelson. *Meetings*, Y.M.C.A., First Wednesdays, October to April. *Sec.*, Hugh Weir, 132, Skegionel Avenue, Belfast.

***Belfast.—Queen's Island P.S.**—*Pres.*, T. A. Smith. *Meetings*, Pirrie Park, Belfast, Second Wednesdays, 8 p.m. *Sec.*, R. Scott, 28, Wingrove Gardens, Bloomfield, Belfast.

Bellshill and Mossend Y.M.C.A. C.C.—*Pres.*, Alex. Cameron. *Meetings*, Y.M.C.A., Main Street, Thursdays, 8 p.m. *Sec.*, Robert Howe, 49, Kenilworth Crescent, Bellshill, Lanarkshire.

***Belmont C.C.**—*Pres.*, D. Norris. *Meetings*, Sherwood House, York Road, Battersea. *Sec.*, W. F. Webb, Belmont Works, Battersea, S.W. 11.

Bethnal Green C.C.—*Pres.*, Percy Harris. *Meetings*, Men's Institute, 229, Bethnal Green Road, Wednesdays, 7.30 p.m. *Sec.*, A. Mason, 68, Old Ford Road, E. 2.

***Bexley Heath P.S.**—*Pres.*, C. J. Wilson. *Meetings*, Congregational Church, Market Place, Second and Fourth Mondays, 7.30 p.m. *Sec.*, H. L. Atwood, Sandown, Brampton Road, Bexley Heath, Kent.

***Birkenhead Y.M.C.A. P.S.**—*Pres.*, S. D. Casebourne. *Meetings*, Club Room, Y.M.C.A., Grange Road, Wednesdays, 7.45 p.m. *Sec.*, S. H. Caruth, 12 Gorsefield Road, Birkenhead, Cheshire.

***Birmingham P.S.**—*Pres.*, Bernard Moore. *Meetings*, 39, Great Charles Street, Tuesdays, 7 p.m. *Sec.*, E. H. Bellamy, 20, Waterloo Street, Birmingham.

B'ham.—Britannic Assurance Co.'s C.C.—*Pres.*, J. A. Jefferson. *Sec.*, F. B. Wharton, Britannic Assurance Co., Ltd., Broad Street Corner, Birmingham.

Birmingham Central Technical College P.S.—*Pres.*, F. Green. *Meetings*, Technical College, Suffolk Street, Mondays, 7.30 p.m. *Sec.*, J. Williams, 112, Baldwin's Lane, Hall Green, Birmingham.

Birmingham Field Naturalists' Club.—*Pres.*, J. Humphreys, M.A. *Meetings*, Digbeth Institute, Tuesdays, 7.30 p.m. *Sec.*, H. Potter, 387, Moseley Road, Birmingham.

Birmingham.—Magnet (G.E.C.) P.C.—*Pres.*, S. Darby. *Meetings*, Magnet Club House, Witton, Mondays, 7.15 p.m. *Sec.*, W. R. Cox, Magnet Photographic Club, General Electric Co., Witton.

Birmingham Photographic Art Club.—*Pres.*, J. C. Archer. *Meetings*, 178, Broad Street, Thursdays, 7.30 p.m. *Sec.*, A. L. Williams, 116, Newlands Road, Stirchley.

***Bishop Auckland P.S.**—*Pres.*, Alfred Harburn. *Meetings.*, Grosvenor Club, 1, Silver Street, First and Third Mondays, 7.30 p.m. *Sec.*, T. Ambler, 7, May Street.

***Bishopsford C.C.**—*Pres.*, Francis E. Powell. *Meetings.*, Minerva House, Bevis Marks, London, E.C. 3, Thursdays, 5.30 p.m. *Sec.*, A. J. L. Greig, 36, Queen Anne's Gate, Westminster, London, S.W. 1.

Blackburn and District C.C.—*Pres.*, Dr. H. Harrison. *Meetings.*, Kensington Chambers, Sudell Cross, Blackburn. *Sec.*, Hy. Cotton, 16, June Street, Blackburn.

***Blackheath.—Christ's College P.S.**—*Pres.*, Arthur C. Wire, B.A. *Meetings*, Christ's College, Blackheath, Alternate Mondays, 6 p.m. *Sec.*, A. J. Heasman, Christ's College.

***Blackpool and Fylde P.S.**—*Pres.*, F. C. Harper. *Meetings*, 41A, Market Street, Blackpool, Mondays and Tuesdays, 7.45 p.m. *Sec.*, R. S. Turton, 10, Whitegate Drive, Blackpool.

Blairgowrie Photographic Association.—*Meetings*, 35, Allan Street, Blairgowrie, Third Tuesdays, from March 17th, 7.30 p.m., except June to August. *Sec.*, D. S. Maclennan, Marchmont, Blairgowrie.

***Board of Education P.S.**—*Pres.*, D. F. Heard. *Meetings*, Board of Education, Whitehall, S.W. 1, Mondays, 5.15 p.m. *Sec.*, E. H. Stevens, Victoria and Albert Museum, South Kensington, S.W. 7.

***Bolton C.C.**—*Meetings*, Bradford Buildings, Mawdsley Street, Alternate Thursdays and Saturdays. *Sec.*, T. H. Reddy, 4, Bristol Avenue, Tonge Moor, Bolton.

Bootle P.S.—*Pres.*, Miss K. Kirkpatrick. *Meetings*, Art Gallery, Oriel Road, Wednesdays, 8 p.m. *Sec.*, Ronald Gordon, 5, Southey Street, Bootle.

***Borough Polytechnic P.S.**—*Pres.*, A. H. Redman. *Meetings*, Borough Polytechnic Institute, Wednesdays, 7.30 p.m. *Sec.*, S. John Gollop, 40, Fishponds Road, Upper Tooting, S.W. 17.

***Bournemouth C.C.**—*Pres.*, Dr. F. G. Penrose. *Meetings*, Town Hall, Mondays, 7.30 p.m. *Sec.*, F. G. Burroughs, 88, Old Christchurch Road, Bournemouth.

Bournville C.C.—*Pres.*, A. E. Harris. *Meetings*, Club Room, Dining Block Bournville Works Wednesdays, 7.15 p.m., from September. *Secs.*, W. H. L. Minney, 253, Mary Vale Road, Bournville, and Miss K. M. Ordidge, 77, Heathcote Road, Kings Norton, Birmingham.

***Bowes Park and District P.S.**—*Pres.*, J. H. Dundas. *Meetings*, Public Library, Wood Green, Tuesdays, 8 p.m. *Sec.*, R. A. Spotswood, 51, Glenthorne Avenue, Addiscombe, Surrey.

***Bradford P.S.**—*Pres.*, Arthur Marshall. *Meetings*, Mechanics' Institute, Mondays, 7.30 p.m. *Sec.*, Edgar Rawnsley, Ribble Dene, Menston-in-Wharfdale.

Brechin Photographic Association.—*Pres.*, Wm. Shaw Adamson, J.P. *Meetings*, Mechanics' Institute, Alternate Thursdays, 7.30 p.m., from September. *Sec.*, R. C. Brown, 10, Cookston Road.

***Bridge of Allan and District P.S.**—*Pres.*, George J. Hughes. *Meetings*, The Studio, Bridge of Allan, Mondays, 7.30 p.m. *Sec.*, Miss A. F. Souter, Netherby, Bridge of Allan.

Brighouse Photographic and Naturalist Society.—*Pres.*, Geo. Hepworth. *Meetings*, Town Hall Buildings, Hall Street, Thursdays, 7.30 p.m., October to April. *Sec.*, H. Robinson, The Hives, Clifton, Brighouse.

***Brighton and Hove C.C.**—*Pres.*, F. Burfield Dyer. *Meetings*, 71, East Street, Brighton, Wednesdays. *Sec.*, R. J. Botting, 66, St. George's Road, Brighton.

Brighton Post Office C.C.—*Pres.*, F. C. Tansley. *Meetings*, Irregular. *Sec.*, A. Gill, 35, Stanford Road, Brighton.

***Bristol and West of England Amateur Photographic Association.**—*Pres.*, O. R. Langley. *Meetings*, University and Literary Club, 20, Berkeley Square, Clifton, Second and Fourth Fridays, 8 p.m., October to Easter. *Sec.*, Mordaunt Miller, 7, All Saints Road, Clifton.

***Bristol P.S.**—*Pres.*, A. Howard Garmston. *Meetings*, Methven Brownlee Studios, 18, Charlotte Street, Wednesdays, October to April, 7.30 p.m. *Sec.*, Herbert Mizen, 98, Coronation Road.

***Bristol.—Fry's P.C.**—*Pres.*, A. E. Cater. *Meetings*, First and Third Tuesdays, *Sec.*, E. G. Shore, c/o J. S. Fry & Sons, Union Street, Bristol.

***Bromley (Kent) C.C.**—*Pres.*, F. R. Ball. *Meetings*, Bromley Literary Institute, First and Third Thursdays, 8 p.m., October to March. *Sec.*, H. E. Isard, 24, Queen's Road, Bromley.

Burnley Mechanics' Institution C.C.—*Pres.*, R. A. Johnson. *Meetings*, Mechanics' Institution, Manchester Road, Alternate Tuesdays, 7.45 p.m. *Sec.*, A. Entwistle, 13, Godiva Street.

Bury P.S.—*Pres.*, J. H. Burton. *Meetings*, Athenæum, Market Street, Thursdays, 8 p.m. *Sec.*, Wm. Rhone, 127, Wilton Hill, Radcliffe, Manchester.

***Cambridge and District P.C.**—*Pres.*, Dr. W. H. Bansall. *Meetings*, Club House, Ram Yard, Tuesdays, 7.30 p.m. *Sec.*, R. T. Bellamy, 21, Coleridge Road, Cambridge.

Cambuslang.—Gilberfield Co-operative C.C.—*Pres.*, G. Crichton. *Meetings*, 256, Hamilton Road, Cambuslang, Tuesdays, 7.30 p.m. *Sec.*, Thomas Clark, 31, Craigallian Avenue, Halfway, Cambuslang.

Cambuslang Parish Church C.C.—*Pres.*, David Honeyman. *Meetings*, 53, Greenlees Road, Fridays, 7.30 p.m. *Sec.*, D. M. Honeyman, 13, Stewarton Drive, Cambuslang.

Camera Club, The.—*Meetings*, 17, John Street, Adelphi, W.C. Thursdays, 8.15 p.m. *Sec.*, H. Philp, 17, John Street, Adelphi, London, W.C. 2.

***Canterbury C.C.**—*Pres.*, Dr. R. Graham Wills. *Meetings*, Gaywoods Rooms, 41, High Street, Alternate Mondays, from October 1, 8 p.m. *Sec.*, Henry William Robinson, 35, Forty Acres Road.

***Cardiff, C.C.**—*Pres.*, E. H. Griffiths. *Meetings*, Y.M.C.A., Queen Street, Thursdays, 7.30 p.m. *Sec.*, H. Matthews, Heath House, Heathwood Road.

Cardiff Naturalists' Society (Photographic Section.—*Pres.*, J. A. Lomax. *Meetings*, Engineers' Institute, Park Place. Alternate Tuesdays, 8 p.m., from October. *Sec.*, T. J. Wakley, Saint Dochdwys., Llandough, nr. Cardiff.

***Castleford Y.M.C.A. P.S.**—*Meetings*. Y.M.C.A., Carlton Street, Frid ys 7.30 p.m. *Sec.*, H. Akeroyd, "Ex press" Office, Castleford.

***C.C.C.P.S.**—*Pres.*, G. L. Bisset. *Meeting* 9, Endsleigh Gardens, W.C. 1, First and Third Thursdays. *Sec.*, F. T. Trewin, 9, Endsleigh Gardens, London.

***Centymca P.S.**—*Meetings*, Y.M.C.A., Tottenham Court Road, W.C. 1. *Sec.*, G. A. Flook, Y.M.C.A., Tottenham Court Road, London, W.C. 1.

***Chatham.—Medway Amateur P.A.**—*Pres.*, H. F. Wingent. *Meetings*, Camera Cottage, Medway Street, Thursdays. *Sec.*, R. C. Burton, 24, Windmill Road, Gillingham, Kent.

***Chelsea P.S.**—*Pres.*, H. H. Wrench. *Meetings*, Chelsea Polytechnic, Manresa Road, Alternate Tuesdays, 8 p.m. *Sec.*, A. E. Beach, Shawfield Street, Chelsea, S.W. 3.

***Cheltenham Amateur P.S.**—*Pres.*, Paul Fripp. *Meetings*, 3, Ormond Terrace, Alternate Wednesdays, 5.30 p.m., from October, *Sec.*, G. H. Smithson, 17, Regent Street, Cheltenham.

Cheltenham College P.S.—*Pres.* and *Sec.*, A. B. Lloyd-Baker, M.A. *Meetings*, Physics Lecture Room.

Chester Natural Science Society (Photographic Section).—*Pres.*, Councillor F. W. Higgins. *Meetings*, Grosvenor Museum, Thursdays, 8 p.m. *Sec.*, A. E. Matthews.

Chester Y.M.C.A. P.S.—*Pres.*, F. W. Higgins. *Meetings*, The Old Palace, last Thursdays. *Sec.*, Thomas Williams, 33, White Friars, Chester.

Chichester P.S.—*Pres.*, F. B. Tompkins. *Meetings*, Flint House, South Street, Tuesdays, 7 p.m. *Sec.*, J. W. Barnes, Clyde House, Chichester.

***Chiltern Club of Arts P.S.**—*Pres.*, Mrs. Jopling-Rowe. *Sec.*, J. H. Jay, The Quinta, Elm Close, Amersham, Bucks.

***Chiswick General Sports Association P.S.**—*Pres.*, G. J. Shave. *Meetings*, Chiswick Works. *Sec.*, A. Barnes, L.G.O.C., Chiswick Works, Chiswick High Road, W. 4.

Chorley P.S.—*Pres.*, John Rawlinson. *Meetings*, Primrose Cottage Gardens, Mondays, as arranged, 7.45 p.m. *Sec.*, Reginald Wilson, 22, Halliwell Street, Chorley.

***City of London and Cripplegate P.S.**—Chairman, J. J. Butler. *Meetings*, Cripplegate Institution, Golden Lane, E.C. 1, Mondays, 6.30 p.m., from October 1. *Sec.*, A. R. Traube, 23, Victoria Terrace, Queen's Road, Battersea, S.W. 8.

Clydebank.—Singer C.C.—*Pres.*, Jas. Stewart. *Meetings*, Singer Recreation Hall, Clydebank, Thursdays, 7.45 p.m. *Sec.*, John Simpson, 22, Cornock Crescent, Clydebank.

Coatbridge Photographic Association.—*Pres.*, G. Dickson. *Meetings*, Carnegie Library, Academy Street, Thursdays, 8 p.m., from October 20. *Sec.*, W. Scott, 107, Alexander Street, Coatbridge.

Coathridge Co-Operative C.C.—*Pres.*, D. Laird. *Meetings*, Co-operative Library Hall, Second Thursdays, 7.30 p.m. *Sec.*, A. Gibbs, 99, Dunbeth Road, Coatbridge.

Colne C.C.—*Pres.*, J. S. Gaukroger. *Meetings*, Vivary Buildings, Spring Lane, Fridays, 8 p.m. *Sec.*, J. B. Rycroft, 103, Langroyd Road, Colne, Lancs.

***Coventry P.C.**—*Pres.*, H. G. Wagstaff. *Meetings*, Y.M.C.A., The Quadrant, Wednesdays, 8 p.m. *Secs.*, R. Longden, 11, Fisher Road, Coventry, and E. A. Herbert, 142, Leicester Causeway, Coventry.

***Coventry.—Armstrong-Siddeley P.C.**—*Pres.*, J. D. Siddeley. *Meetings*, Armstrong-Siddeley Social Club, Wednesdays, 8 p.m. *Sec.*, P. F. Altree, Armstrong-Siddeley Athletic and Social Club, Parkside, Coventry.

Cowlairs Co-operative C.C.—*Pres.*, J. MacFarlane. *Meetings*, Kemp Street, Springburn, Glasgow, Fridays, 8 p.m. *Secs.*, J. Benson and J. Evans, 119, Gourlay Street, Springburn, Glasgow.

***Croydon C.C.**—*Pres.*, John Keane. *Meetings*, Phœnix House, 128A, George Street, Wednesdays, 8 p.m. *Sec.*, Vivian Jobling, 60, Gordon Road, Carshalton.

Croydon.—Whitgift Grammar School P.S.—*Pres.*, The Head Master. *Sec.*, B. B. Kinsey, Whitgift Grammar School.

Culcheth C.C.—*Pres.*, C. W. Godbert, M.A., J.P. *Meetings*, Culcheth School, Droylsden Road, Newton Heath, Third Mondays, 7.30 p.m. *Sec.*, A. Lindley, 18, Derbyshire Road, Clayton Bridge, Manchester.

Dalton Amateur P.S.—*Meetings*, suspended at present. *Sec.*, G. W. Mitchell, 62, Market Street, Dalton-in-Furness.

***Darlington P.S.**—*Pres.*, G. H. Nichols. *Meetings*, Bondgate Studio. *Sec.*, J. H. Tindale, 62, Pensbury Street, Darlington.

***Dartford P.S.**—*Meetings*, Church Institute, Lowfield Street, Second and Fourth Thursdays, 7.30 p.m. *Sec.*, H. S. Targett, 21, High Street.

Dartford-Hallford P.C.—*Pres.*, Everard Hesketh. *Meetings*, irregular. *Sec.*, G. Melville-Bell, J. & E. Hall, Ltd., Dartford Ironworks, Dartford, Kent.

***Darwen Photographic Association.**—*Meetings*, Club Room, Arch Street, Thursdays, 8 p.m. *Sec.*, H. V. Wright, 126, Osborne Terrace, Darwen.

Dennistoun Amateur Photographic Association.—*Pres.*, W. S. Crocket. *Meetings*, 27, Hillfoot Street, Wednesdays, 8 p.m. *Sec.*, John Macdonald, 27, Aberfeldy Street, Dennistoun, Glasgow.

Denstone College P.S.—*Pres.*, Rev. R. M. Grier, M.A. *Sec.*, A. J. Price, M.A., Denstone College, Staffs.

***Deptford and District C.C.**—*Pres.*, S. Myers, B.A. *Meetings*, L.C.C. Schools, Clyde Street, Fridays, 8 p.m. *Sec.*, E. A. C. Moon, 36, St. John's Vale, London, S.E. 8.

***Derby Photographic Society.**—*Meetings*, Cumberland-Brownson & Pages Salerooms, Mondays, bi-monthly, 7.30 p.m. *Sec.*, Miss E. Thompson, 29, Strutt Street, Derby.

***Derby Railway Institute P.S.**—*Pres.*, Ashton Davies. *Meetings*, Derby Railway Institute. *Sec.*, J. E. Greaves.

Dewsbury P.S.—*Pres.*, W. E. Gundill. *Meetings*, Moot Hall, Church Street, Mondays, 8 p.m. *Sec.*, Albert Lyles, Holm Lea, Park Road, Dewsbury.

Doncaster C.C.—*Pres.*, F. A. Jordan. *Meetings*, New Science Room, Guildhall, Alternate Tuesdays, October to April *Sec.*, A. Wilson, 75, Broxholme Lane, Doncaster.

***Dover Institute P.S.**—*Pres.*, Sir E. W. T. Farley. *Meetings*, The Institute, alternate Fridays, 8 p.m. *Sec.*, H. Garland, 5A, High Street, Dover.

Dukinfield P.S.—*Pres.*, Isaac Wright. *Meetings*, Co-operative Hall, Astley Street, Wednesdays, 8.30 p.m. *Sec.*, Frank Major, 98, Astley Street.

Dulwich College P.S.—*Pres.*, E. H. Leach. *Meetings*, Dulwich College, irregular, 7 p.m. *Sec.*, G. F. Wright, Dulwich College, S.E. 21.

***Dundee and East of Scotland Photographic Association.**—*Meetings*, Club Room, Y.M.C.A. Buildings, Dundee, First Thursdays, from October to April, 7.45 p.m. *Sec.*, James Slater, Rosemount, Camphill Road, Broughty Ferry.

***Dunfermline Photographic Association.**—*Pres.*, D. Anderson, M.A. *Meetings*, Carnegie Old Baths, Tuesdays, 7 p.m. *Sec.*, R. Steedman, 14, Viewfield Terrace.

***Dunfermline Naturalists' Society (Photographic Section).**—*Pres.*, Peter Christie. *Meetings*, Abbot's House, Abbot Street, First and Third Tuesdays, 7.30 p.m. *Sec.*, William Clarke, 9, Howard Crescent, Dunfermline.

Durham City C.C.—*Pres.*, W. A. Shiphardson. *Meetings*, Y.M.C.A., Second and Fourth Tuesdays, 7.30 p.m. *Sec.*, Ralph Walt, 2A, Old Elvet, Durham.

***Ealing P.S.**—*Pres.*, J. Vacy Lyle. *Meelings*, Town Hall, Second and Fourth Wednesdays, 8 p.m. *Sec.*, A. S. Kirbyshire, M.A., 5, Cairn Avenue, Ealing, W. 5.

Ealing County School P.S.—*Pres.*, Lewis Marsh, M.A. *Meetings*, Ealing County School, Tuesdays, 4.20 p.m. *Sec.*, D. M. Roberts, M.A., The County School, Ealing, London, W. 5.

***Eastbourne P.S.**—*Meetings*, Technical Institute, Thursdays, 8 p.m. *Sec.*, H. R. Hudson, "Jesmond," Arlington Road, Eastbourne.

Eastbourne Natural History, Photographic and Literary Society.—*Meetings*, Technical Institute, Thursday, 8.0 p.m.

Eastern Arts Club.—*Pres.*, S. H. Hancock. *Meetings*, Eastern District Post Office. *Sec.*, A. H. Cantwell, Eastern District Office, London, E. 1.

Edgware Art Circle.—*Sec.*, J. A. S. Brown, Keston, Whitchurch Lane, Edgware.

***Edinburgh P.S.**—*Pres.*, P. T. Mackintosh. *Meetings*, 117, George Street, First and Third Wednesdays, October to April, 8 p.m. *Sec.*, R. W. Martin, W.S., 117, George Street, Edinburgh.

Edinburgh P.C.—*Pres.*, W. H. Hamilton. *Meetings*, 117, George Street, Second Thursdays, October to May, 8 p.m. *Sec.*, F. Ernest Kohler, 151, Mayfield Road, Edinburgh.

Edinburgh.—Heriot C.C.—*Pres.*, A. Hardie. *Meetings*, George Heriot's School, Alternate Fridays.

Erdington and District P.S.—*Pres.*, H. J. Trueman. *Meelings*, The Church House, High Street, Mondays, 8 p.m. Sec., H. C. Chamberlin, "Kenelm," Grange Road, Erdington, Birmingham.

***Exeter C.C.**—*Pres.*, H. N. Tanner. *Meetings*, Rougemont House, Tuesdays, from October 2nd. *Sec.*, Miss A. P. Nicholls, 5, Baker Street, Heavitree, Exeter.

***Fakenham Literary, Field and C.C.**—*Pres.*, G. Bales. *Meetings*, Church Institute, Tuesdays, 8 p.m. *Sec.*, J. C. Holton, next P.O., Fakenham.

Farnborough.—Reflex P.S.—*Pres.*, F. Baker. *Meetings*, irregular, for staff only. Technical Staff Mess, R.A. Establishment. *Sec.*, Ernest J. H. Lynam, Rofnyl, Waverley Road, South Farnborough, Hants.

***Faversham Institute P.S.**—*Meetings*, The Institute, Wednesdays. *Sec.*, W. H. Evernden, 116, West Street, Faversham.

***Finchley and District P.S.**—*Pres.*, Dr. Dobson. *Meetings*, North Road Council Schools, East Finchley, First and Third Fridays. *Sec.*, Mrs. Jakobi, 29, Highwood Avenue, N. Finchley, N. 12.

***Forest Hill and District P.S.**—*Pres.*, J. A. Webberley. *Meetings*, 42, London Road, Forest Hill, Tuesdays, 8 p.m., from October to April. *Sec.*, A. Hilson-White, 35, Harvard Road, Lewisham.

Garswood Hall Collieries Institute C.C.—*Pres.*, J. H. Edmonson. *Meetings*, Institute, Wednesdays, 7.30 p.m. *Sec.*, W. H. Berry, 383, Old Road, Ashton-in-Makerfield, near Wigan.

***Gateshead and District C.C.**—*Pres.*, William Mitchell. *Meetings*, Bensham Grove Settlement, Thursdays, from October, 7.30 p.m. *Sec.*, J. H. H. Telford, 27, Peterborough Street, Gateshead.

Glasgow.—See also Cowlairs, Dennistoun, Hallside, Kinning Park, Partick, Rutherglen, Shettleston.

***Glasgow and West of Scotland Amateur Photographic Association.**—*Pres.*, R. B. Johnstone. *Meetings*, 180, West Regent Street, Glasgow, Mondays, 8 p.m. *Sec.*, G. Hunter Martin, 114, West Campbell Street, Glasgow.

Glasgow and District Photographic Inter-Club Committee.—*Pres.*, W. S. Crocket. *Sec.*, John Macdonald, 27, Aberfeldy Street, Dennistoun, Glasgow, E. 1.

Glasgow.—Allan Glen's School C.C.—*Pres.*, John Talman, M.A. *Meetings*, Allan Glen's School, Second or Third Tuesdays, 3.40 p.m. *Sec.*, W. Allan, M.A., Allan Glen's School, Glasgow.

Glasgow.—Barr and Stroud C.C.—*Pres.*, Neil J. Maclean, B.Sc. *Meetings*, Club Room, Tuesdays. *Sec.*, Wm. G. Leslie, Messrs. Barr and Stroud, Anniesland, Glasgow, W. 3.

Glasgow.—Beardmore (Parkhead) P.S.—*Pres.*, G. Stevens. *Meetings*, East Wellington Street, Parkhead, Fridays, 7.30 p.m. *Sec.*, Robert Blount, 9, St. Mark Street, Shettleston, Glasgow.

Glasgow.—Cockburns Cardonald C.C.—*Pres.*, William F. Drynan. *Sec.*, William McKendry, 198, Gourlay Street, Glasgow, N.

Glasgow Corporation Electric Tramways C.C.—*Meetings*, Hayburn Street, Partick. *Sec.*, James A. B. Harley, 65, Dumbarton Road, Partick, Glasgow.

Glasgow.—St. George Co-operative C.C.—*Pres.*, J. D. Morton. *Meetings*, 40, Gladstone Street, Mondays, from October 1, 8 p.m. *Sec.*, Ernest H. Campbell, 67, Stratford Street, Glasgow, N.W.

Glasgow.—St. Mungo's Academy C.C.—*Pres.*, R. McLeod, M.A. *Meetings*, St. Mungo's Academy, Wednesdays, 4 p.m. *Sec.*, James Bcsant, Auldhouse Cottage, Pollokshaws, Glasgow.

***Glasgow (South) C.C.**—*Pres.*, J. H. Edgar. *Meetings*, 43, Bankhall Street, Govanhill, Tuesdays, 8 p.m. *Sec.*, J. Smith, 30, Cromwell Road, Queen's Park, Glasgow.

Glasgow.—S.C.W.S. Welfare C.C.—*Pres.*, Claude Lindsay. *Meetings*, 59, Morrison Street, Alternate Tuesdays. *Sec.*, Robert Philip, 29, Katherine Drive, Glasgow, S.W. 1.

Glasgow.—U.C.B.S. C.C.—*Pres.*, J. Boyd. *Meetings*, 150, South York Street, Wednesdays, 7.30 p.m. *Sec.*, William Kirkwood, 57, Clincarthill Road, Rutherglen.

Glasgow.—Wallace Scott C.C.—*Pres.*, A. S. Kelly. *Meetings*, Wallace Scott Tailoring Institute, First and Last Thursdays, November to March, 8 p.m. *Sec.*, Miss J. M. Munro, 42, Earlspark Avenue, Newlands, Glasgow.

Glasgow Y.M.C.A. C.C.—*Pres.*, A. J. Adie. *Meetings*, Central Y.M.C.A., Mondays, 8 p.m. *Sec.*, D. Gilchrist, 201, Kent Road, Sandyford, Glasgow.

***Gloucester P.S.**—*Pres.*, Lieut.-Col. E. B. Joune. *Meetings*, Temporarily Suspended. *Sec.*, Donald Jones, 1, Cromwell Villas, Cromwell Street, Gloucester.

***Glyn's House Club P.S.**—*Pres.*, L. Currie. *Sec.*, E. G. Dawson, 47, Leamington Gardens, Goodmayes, Essex.

***Golders Green.—Temple Fortune C.C.**—*Pres.*, Rev. E. G. Turner, M.A. *Meetings*, St. Barnabas Small Hall, Cranbourne Gardens, Third Mondays, 8 p.m. *Sec.*, C. G. Watts, 60, Leeside Crescent, Golders Green, London.

***G.P.O. Arts Club (Photographic Section).**—*Pres.*, Rt. Hon. Sir W. Mitchell-Thomson. *Sec.*, H. E. Long, Inland Section, G.P.O., London, E.C. 1.

***Grays.—Palmer's School P.S.**—*Pres.*, Rev. H. A. Abbott, M.A. *Meetings*, Alternate Mondays, 3.45 p.m. *Sec.*, J. Baxenden, B.Sc., Palmer's School, Grays, Essex.

***Greenock C.C.**—*Pres.*, James Wylie. *Meetings*, 21, Kilblain Street, Thursdays, 8 p.m. *Sec.*, James L. Cowan, 22, Waverley Street, Greenock.

Greenock.—Kincaid's Employees' C.C.—*Pres.*, D. Millar. *Meetings*, Kincaid's Canteen, East Hamilton Street, Thursdays, 7 p.m. *Sec.*, Alex. Main, 6, Jardine Terrace, Greenock.

***Grimsby P.S.**—*Pres.*, J. H. Hall. *Meetings*, Church House, Bull Ring, alternate Tuesdays, 7.30 p.m. *Sec.*, H. F. Popple, 362, Hainton Avenue.

Guernsey P.S.—*Pres.*, C. H. Toms. *Meetings*, Guille-Alles Library, First

Mondays, winter, 8 p.m., First Thursdays, summer. *Sec.*, L. Robilliard, Richmond Avenue, Guernsey.

***Guildford and District C.C.**—Chairman, H. G. Bailey, *Meetings*, 1, Quarry Street, Guildford, Alternate Tuesdays, October to April, 8 p.m. *Sec.*, D. E. H. Box, "Wroxeter," Mountside, Guildford.

***Guy's Hospital Nurses' P.S.**—*Pres.*, Miss E. E. P. MacManus. *Meetings*, Nurses' Home, Guy's Hospital. *Sec.*, Miss M. Smith, Guy's Hospital, London, S.E. 1.

G.W.R. Literary Society (Photographic Section).—*Meetings*, 44, Eastbourne Terrace, Paddington, W.

***Hackney P.S.**—*Pres.*, F. D. Osborn. *Meetings*, Hackney Baths, Tuesdays, 8 p.m. *Sec.*, Walter Selfe, 24, Pembury Road, Clapton, London, E. 5.

***Halifax P.S.**—*Pres.*, J. Halliday. *Meetings*, 4A, Bedford Square, Tuesdays and Thursdays, October to April; First Tuesdays, April to October, 7.30 p.m. *Sec.*, P. S. Colledge, 16, Eversley Mount.

Halifax Y.M.C.A. Photographic Section.—*Pres.*, J. Eastwood. *Meetings*, Y.M.C.A., Clare Hall, Fridays, 7.30 p.m. *Sec.*, P. Waiting, Clare Hall, Halifax.

Hallside C.C.—*Pres.*, Joseph Harley. *Meetings*, Victoria Hall. Fridays, 7.30 p.m. *Sec.*, William Boyd, 20, Dechmont Avenue, Halfway, Cambuslang, near Glasgow.

***Hamilton P.S.**—*Pres.*, I.W. Lightbody. *Meetings*, Public Library, Cadzow Street. *Sec.*, S. D. Easton, Quarryhall, Hamilton, Scotland.

***Hammersmith.—Hampshire House P.S.**—*Pres.*, A. Hanson. *Meetings*, Hampshire House, Hog Lane, King Street, Thursdays, 8 p.m. *Sec.*, S. J. Switch, 10, Hamilton Road, Bedford Park, London.

Hanley P.S.—*Pres.*, J. W. J. Taylor. *Meetings*, Y.M.C.A., Marsh Street, Tuesdays, 7.45 p.m., October to March. *Sec.*, G. T. Boulton, Hallwater Villas, Endon.

Harrogate P.S.—*Pres.*, J. A. Mackay. *Meetings*, Church Institute, Fridays, October to April, 8 p.m. *Sec.*, S. Cartmel, 8, West Cliffe Terrace, Harrogate.

***Haslemere and District C.C.**—*Pres.*, W. E. Muir. *Meetings*, Educational Museum, occasionally. *Sec.*, E. W. Swanton, Museum, Haslemere.

***Hebden Bridge P.S.**—*Pres.* Sam Greenwood. *Meetings*, Secondary School, Tuesdays, 7.30 p.m., Second Saturdays, 7 p.m., from October 2. *Sec.*, Edward B. Gilson, Croft Terrace, Hebden Bridge.

Herrington Burn Y.M.C.A. C.C.—*Meetings*, Y.M.C.A., Tuesdays, 7 p.m. *Sec.*, George H. Lowdon, Y.M.C.A., Herrington Burn, Co. Durham.

***Hetton-le-Hole Amateur P.S.**—*Pres.*, J. T. Goymer. *Meetings*, Lyons, Alternate Thursdays, 7.15 p.m. *Sec.*, Norman R. Palmer, Social Club, Hetton-le-Hole, Co. Durham.

***Horbury C.C.**—*Pres.*, Rev. E. E. C. Elford. *Meetings*, St. Mary's Hall, Horbury Junction, Tuesdays, 7.30 p.m. *Sec.*, V. Suddaby, Hall Cliffe Road, Horbury.

***Horwich Institute Amateur P.S.**—*Pres.*, G. N. Shawcross. *Meetings*, Mechanics' Institute. *Sec.*, Harry Smith, 12, Dixon Street, Horwich.

Hucknall and District P.S.—*Pres.*, Dr. R. O. C. Thompson. *Meetings*, Y.M.C.A. Alternate Mondays, 7 p.m. *Sec.*, Leonard Asbury, 175, Beardall Street.

***Huddersfield Naturalist Photographic and Antiquarian Society.**—*Pres.*, Dr. T. W. Woodhead. *Meetings*, Technical College Alternate Thursdays, 7.30 p.m. and Public Library Buildings, Fridays, 7.30 p.m. *Sec.*, H. H. Charlesworth, 1, Dyson Street, Dalton, Huddersfield.

***Hull P.S.**—*Pres.*, C. W. Rodmell. *Meetings*, Society's Rooms, Grey Street, Park Street, Thursdays, 8 p.m., and Fridays, 7 p.m. *Sec.*, T. R. A. Smith, 5, Caroline Place, Hull.

***Hygeia C.C.**—*Pres.*, T. Lindsay, *Meetings*. Ministry of Health, Whitehall, S.W. 1. Mondays, 5.30 p.m. *Sec.*, H. G. Ledger, 274, Cricklewood Lane, London, N.W. 2.

***Ibis C.C.**—*Pres.*, A. C. Thompson. *Meetings*, 142, Holborn Bars. *Sec.*, E. F. Simons, 142, Holborn Bars, London.

***Ilford P.S.**—*Pres.*, W. T. Richmond. *Meetings*, Cecil Hall, Park Avenue. Wednesdays, 8 p.m. *Sec.*, Edward Lines, 52, Wingate Road, Ilford.

Ilkeston Arts Club.—*Pres.*, The Mayor. *Meetings*, Public Library, Tuesdays and Fridays. *Sec.*, Arthur Smith, B.Sc., 31, Lower Stanton Road, Ilkeston.

Ilkley P.S.—*Pres.*, Dr. H. de P. B. Veale, J.P. *Meetings*, Guild Room, Wesleyan Assembly Hall, Tuesdays, 7.30 p.m. *Sec.*, Miss E. Dean, 13, Leeds Road, Ilkley.

Inland Revenue P.S.—*Pres.*, Sir Ernest Gowers, K.C.B. *Meetings*, York House, Kingsway, W.C., Second Tuesdays and Wednesdays, alternatively 6 p.m. *Sec.*, Miss H. L. Innell, Central Hotel, Percy Street, London, W. 1.

Ipswich and District P.S.—*Pres.*, Arthur Woolford. *Meetings*, Ipswich Museum, alternate Mondays, 7.30 p.m. *Sec.*, Leonard Lewer, Prudential Buildings, Princes Street, Ipswich.

***John Ruskin C.C.**—*Pres.*, Harry Day, M.P. *Meetings*, Walworth Men's Institute, Beresford Street. *Sec.*, George Paul, 50, Fairmount Road, Brixton Hill, London, S.W. 2.

***Keighley and District Photographic Association.**—*Pres.*, W. Speight. *Meetings*, Devonshire Chambers, 70, North Street, Thursdays, 7.30 p.m. *Sec.*, J. Nicholson, "Ranza," Braithwaite Road, Keighley.

***Keith Field Club (Photographic).**—*Pres.*, William Robb. *Meetings*, Institute Buildings, First and Third Mondays, 8 p.m. *Sec.*, John Pirie, 63, Moss Street, Keith.

***Kendal P.S.**—*Pres.*, Dr. Cockill. *Meetings*, Public Library, Tuesdays, 7.15 p.m. *Sec.*, H. F. Alsop, 15, Highfield, Kendal.

***Kennaway P.S.**—*Pres.*, Rev. E. F. E. Wigram. *Meetings*, 6, Salisbury Square, E.C. 4. *Sec.*, A. S. Brine, 6, Salisbury Square, London, E.C. 4.

Kew C.C.—*Pres.*, T. J. Dale. *Meetings*, as arranged. *Sec.*, W. H. Cable, F.D.K. 6A, Ministry of Labour, Kew.

***Kidderminster and District P.S.**—*Pres.*, P. G. Hopcroft. *Meetings*, Kingsley Hall, Vicar Street, Mondays, October to April, 8 p.m. *Secs.*, P. G. Hopcroft, New Street, Stourport, Worcs., and G. N. Weston, Roden House, Kidderminster.

***Kilburn and Willesden P.S.**—*Meetings*, Willesden Polytechnic, Priory Park Road, Kilburn, Tuesdays, 7.30 p.m., October to April. *Sec.*, J. V. Willis, 430, Harrow Road, London, W. 9.

Kinning Park Co-operative Society C.C.—*Meetings*, Co-operative Hall, 18, Coburg Street, Glasgow, Alternate Thursdays, 8 p.m. *Sec.*, Dan McLachlan, 21, Weir Street, Glasgow, C. 5.

***Kodak Staff P.S.**—Chairman, R. Kershaw. *Sec.*, J. M. Hoffmeister, Kodak, Ltd., Kingsway, London, W.C. 2.

***Kodak Works C.C.**—*Pres.*, W. G. Bent. *Meetings*, "Abberley," Kodak Works, Wednesdays, 7.30 p.m. *Sec.*, J. V. Elliot, Kodak, Ltd., Wealdstone.

***Leamington and District P.S.**—*Pres.*, W. Hammond. *Meetings*, 18, Parade, Leamington, alternate Tuesdays from October to April, 8 p.m. *Sec.*, C. W. Stephens, 1, Portland Street, Leamington Spa.

Leeds Amateur Cinematographers' Association.—Chairman, W. J. S. Carpenter. *Meetings*, Avenue House, Woodhouse Lane, alternate Mondays, 8 p.m. *Sec.*, P. G. Peacock, 182, Cardigan Road, Leeds.

Leeds C.C.—*Pres.*, W. Scruton. *Meetings*, Leeds Institute, Cookridge Street, Mondays, 7.30 p.m. *Sec.*, A. R. Westerman, 12, Nunington Street, Armley, Leeds.

Leeds P.S.—*Pres.*, J. Carr. *Meetings*, Leeds Institute, Tuesdays, 7.30 p.m. October to April. *Sec.*, W. Rider, 268, Dewsbury Road, Leeds.

Leeds University P.S.—*Pres.*, Prof. Gilles pie. *Meetings*, The University, Tuesdays, 5.30 p.m. *Sec.*, R. O. Hall, University, Leeds.

Leek P.S.—*Pres.*, John Hall, J.P. *Meetings*, Alexandra Club, Market Place, Thursdays, 8 p.m. *Sec.*, J. H. Ratcliffe, 54, Nab Hill Avenue, Leek, Staffs.

***Leicester and Leicestershire P.S.**—*Pres.*, J. W. Martin. *Meetings*, Forrestors' Institute, St. Nicholas Street, Wednesdays, 7.30 p.m. *Secs.*, H. Foscutt, 19, Doncaster Road, Leicester, and G. T. Herbert, 40, Brazil Street, Leicester.

Leigh Literary Society (Photo. Section).—*Pres.*, Dr. Jos. Jones. *Meetings*, Institute, Ellesmere Street, Tuesdays, 8.15 p.m. *Sec.*, Miss Wareing, Glen Doone, Chestnut Avenue, Leigh, Lancs.

***Leighton Buzzard Field Club (Photographic Section).**—*Pres.*, R. Richmond. *Meetings*, The Institute. *Sec.*, Miss A. M. Mossman, 3, Albany Road, Leighton Buzzard.

***Leith Amateur Photographic Association.**—*Pres.*, Wm. B. Scott. *Meetings*, 6, Charlotte Street, Tuesdays, 8 p.m., October to April. *Sec.*, T. B. Meikle, 13, Cadiz Street, Leith.

***Letchworth C.C.**—*Pres.*, D. W. Brunt. *Meetings*, Museum Buildings, Fridays, 8 p.m. *Sec.*, Harry Meyer, 5, Souberie Avenue, Letchworth.

***Lewes Scientific Society (Photographic Section).**—*Meetings*, St. Wilfrids House, Second and Fourth Tuesdays, October to April. *Sec.*, R. Lawson Russell, 178, High Street, Lewes.

***Leytonstone and Wanstead C.C.**—*Pres.*, C. Smith. *Meetings*, Wesleyan Church Parlour, High Road, Leytonstone. *Sec.*, Miss E. Drake, 4a, Carlton Villas, Barclay Road, Leytonstone, E. 11.

L.G.O.C.S.A. Photographic Section.—*Pres.*, Rt. Hon. Lord Ashfield. *Sec.*, W. H Jones, L.G.O.C. Garage, Leyton Green.

***Lincoln C. C.**—*Pres.*, C. W. Dixon. *Meetings*, Ruston's Spike Island Canteen. *Sec.*, W. A. Codd, 416, Monks Road, Lincoln.

***Liverpool Amateur Photographic Association.**—*Pres.*, Col. J. M. McMaster. *Meetings*, 5, Bluecoat Chambers, School Lane, Tuesdays and Thursdays, October to March, 7.45 p.m. *Sec.*, W. A. Blanchard, 5, Bluecoat Chambers, School Lane, Liverpool.

Liverpool Central Y.M.C.A. C.C.—*Pres.*, F. O. Creswell. *Meetings*, Y.M.C.A., Mount Pleasant, Second Tuesdays, 8 p.m. *Sec.*, J. Graham, 12, Birch Road, Oxton, Birkenhead.

***Llanelly Y.M.C.A. P.S.**—*Pres.*, C. Miller. *Meetings*, Y.M.C.A., Fridays, 8 p.m. *Sec.*, Miss G. Wynne, Cystanog, Walters Road, Llanelly.

*L.M.S. (London) P.S.—*Pres.*, J. Fredk. Gee. *Meetings*, Euston Headquarters, Wednesdays, 5.30 p.m. *Sec.*, J. T. White, Euston Hotel, London, W.C. 1.

*London County Council Staff C.C.—*Pres.*, W. H. Fitz Gerald. *Meetings*, County Hall, Westminster Bridge, S.E. 1. First and Third Mondays, 6 p.m. *Sec.*, B. C. Rayment, Comptroller's Dept., County Hall, S.E. 1.

*Loughborough P.S.—*Pres.*, W. F. Charles, *Meetings*, Tudor Hall, Southfield Road, alternate Thursdays, 7.45 p.m. *Sec.*, F. C. Haynes, 19, Baxter Gate.

*Luton and District C.C.—*Pres.*, Murray Barford. *Meetings*, Fortnightly (winter), Monthly (summer). *Sec.*, F. G. Clements, Highfield, 12, Cromwell Hill.

*Maidstone and District P.S.—*Pres.*, J. E. Austin, F.R.A.S *Meetings*, Church Institute, Maidstone, Mondays, 7.30 p.m. *Secs.*, J. H. Baker, 73, Salisbury Road, and E. C. Wood, 17, Salisbury Road, Maidstone.

*Manchester Amateur P.S.—*Pres.*, C. J. Unsworth. *Meetings*, Manchester Social Club Buildings, Lower Mosley Street, Tuesdays, 7.30 p.m. *Sec.*, Geo. A. Platt, 7, Poplar Avenue, Whalley Range, Manchester.

Manchester P.S.—*Pres.*, R. W. Blakeley. *Meetings*, Milton Hall, Deansgate, Second Mondays, September to May, 7.0 p.m. *Sec.*, H. C. Milligan, "Scarsdale," Barkers Lane, Ashton-on-Mersey.

Manchester.—British Dyestuffs Corporation P.S.—*Pres.*, C. J. T. Cronshaw, M.Sc. *Meetings*, The Woodlands, Crescent Road, Crumpsall, Manchester. *Sec.*, W. A. Silvester, M.Sc., Blackley Works, Manchester.

*Manchester.—Chloride C.C. — *Meetings*, Irregular. *Sec.*, V. Kay, Chloride Electrical Storage Co., Ltd., Clifton Junction, near Manchester.

Manchester.—Simpson Memorial C.C.—*Pres.*, Dr. A. T. Lakin. *Meetings*, Simpson Memorial Institute, Moston, Fridays, 8 p.m. *Sec.*, T. H. Wakefield, Simpson Memorial Institute, Moston.

Manchester Y.M.C.A. P.C.—*Pres.*, A. G. Hoyland. *Meetings*, Y.M.C.A., Peter Street, Alternate Mondays. *Sec.*, H. D. Macarthur, 145a, Moss Lane East, Moss Side, Manchester.

Melbourne (Derbys.) P.S.—*Pres.*, H. Dunnicliff. *Meetings*, Council Schools, Fridays, 8 p.m. *Sec.*, F. S. Tivey, Hythe, North Street, Melbourne, Derbys.

*Metrogas P.S.—*Pres.*, Dr. Charles Carpenter. *Meetings*, 709, Old Kent Road, S.E. 15, Tuesdays, 7 p.m. *Sec.*, A. E. Dadson, 709, Old Kent Road, London.

Metropolitan Amateur Cinematographers' Association.—*Vice-Pres.*, J. Aubrey Rees. *Meetings*, First Tuesdays, 7 p.m. *Secs.*, Miss Olga F. C. Shore, and J. K. M. Churchill, 15, Matheson Road, London, W. 14.

Middlesbrough Amateur P.S.—*Pres.*, J. Sillem. *Meetings*, "Lit. and Phil." Corporation Road, Mondays 7.30 p.m., October to April. *Sec.*, N. Osborne, High Street, Eston, Yorks.

*Mirfield P.S.—*Pres.*, J. Kaye. *Meetings*, Oddfellows Hall, Tuesdays, 7.45 p.m. *Sec.*, G. Castle, Granny Lane, Hopton, Mirfield.

Motherwell Y.M.C.A. C.C.—*Pres.*, A Webster. *Meetings*, Y.M.C.A., Thursdays, 8 p.m. *Sec.*, Stewart A. Davidson, 53, Camp Street, Motherwell.

*National Physical Laboratory C.C.—*Pres.*, Dr. W. Rosenhain, F.R.S. *Meetings*, N.P.L., Tuesdays. *Sec.*, G. H. Glaysher, National Physical Laboratory, Teddington.

Nelson C.C.—*Pres.*, S. Chadwick. *Meetings*, Forrest Street, Tuesdays, 8 p.m. *Sec.*, A. S. Birtwistle, 18, Alexander Street, Nelson, Lancs.

*Newcastle and Tyneside P.S.—*Pres.*, W. F. T. Pinkney. *Meetings*, Armstrong College, Tuesdays, 7.30 p.m. *Sec.*, M. B. Crowe, 50, Kingsley Terrace, Newcastle-on-Tyne.

Newcastle (Staffs.) and District C.C.—*Pres.*, G. F. Page. *Meetings*, Lecture Hall, Marsh Street, Mondays, 8 p.m. *Sec.*, G. L. Pedley, 11, Southlands Avenue, Wolstanton, Stoke-on-Trent.

*Newport P.S.—*Pres.*, D. W. Roberts. *Meetings*, Y.M.C.A., Second Tuesdays, 7.30 p.m. *Sec.*, W. R. Watkins, Y.M.C.A., Newport, Mon.

Normanton P.S.—*Pres.*, F. Smith. *Meetings*, Baths Hall, High Street, Tuesdays, 7.30 p.m. *Sec.*, W. Warburton, "Glenesk," The Crescent, Church Fields, Altofts.

*Northants Natural History Society (Photographic Section).—*Pres.*, C. H. Dorman. *Meetings*, 32, Bridge Street, Northampton, as arranged, 8 p.m. *Sec.*, A. E. Tyrrell, "Aysgarth," Birchfield Road East, Northampton.

*North London C.C.—*Pres.*, R. S. Clay, D.Sc. *Meetings*, Northern Polytechnic, Holloway Road, Alternate Wednesdays and Fridays, 8 p.m. *Sec.*, H. B. Wells, 8, Cantlowes Road, London, N.W. 1.

*North Middlesex P.S.—*Pres.*, W. H. A. Fincham. *Meetings*, Mount View Congregational Church, Stroud Green, Thursdays, 8 p.m. *Sec.*, Miss M. E. Blake, 112, Crouch Hill, London, N. 8

***Norwich and District P.S.**—*Pres.*, Miss E. M. Colman. *Meetings*, Public Library, First and Third Mondays, 7.30 p.m. *Sec.*, Richard J. Delf, 41, Park Lane, Norwich.

***Nottingham and Notts P.S.**—*Pres.*, E. L. Kent. *Meetings*, Mechanics' Institute, Nottingham, Alternate Tuesdays, from September, 30, 7.45 p.m. *Sec.*, Alfred Fisher, 6, Gregory Avenue, Lenton, Nottingham.

***Nottm. High School P.S.**—*Pres.*, C. L. Reynolds, M.A. *Meetings*, High School, Tuesdays, 4.15 p.m. *Sec.*, N. G. Jackson, High School, Nottingham.

Oakamoor P.S.—*Pres.*, E. J. Smith, J.P. *Meetings*, Council Schools, Wednesdays, 7.30 p.m. *Sec.*, G. Alkins, 12, The Square, Oakamoor, Staffs.

Oldbury.—Fortress P.C.—*Pres.*, C. F. Bristol. *Meetings*, Chance & Hunt, Ltd., Social Club, Park Lane, Fridays, 8 p.m. *Sec.*, Chas. Lewis, 25, Bromford Road.

***Oldham P.S.**—*Pres.*, G. H. Rider. *Meetings*, Y.M.C.A., Thursdays, 7.45 p.m. *Sec.*, Joseph Dixon, 81, Ward Street, Oldham, Lancashire.

Oldham Equitable P.S.—*Pres.*, J. Conn. *Meetings*, Hope Street, Mondays, 7.45 p.m. *Sec.*, H. Miller, 25, Eric Street, Clarksfield, Oldham.

Oxford P.S.—*Pres.*, R. A. R. Bennett, M.A. *Meetings*, Y.M.C.A., Alternate Tuesdays, 7 p.m. *Sec.*, H. R. F. Sturch, "Hopewell," Elms Road, Botley, Oxford.

***Paisley Philosophical Institution (Photographic Section).**—*Pres.*, C. G. Hutchison, B.Sc. *Meetings*, 55, Oakshaw Street, Fridays, 8 p.m. *Sec.*, Andrew Bennie, 5, Overton Crescent, Johnstone.

Paisley.—Brown and Polson P.C.—*Pres.*, J. A. Nisbet. *Meetings*, Brown and Polson Institute, Alternate Wednesdays, 7.30 p.m. *Sec.*, H. MacMillan, 132, Neilston Road, Paisley.

***Partick C.C.**—*Pres.*, R. Park. *Meetings*, 51a, Peel Street, Wednesdays, 8 p.m. *Sec.*, T. F. Mellor, 51a, Peel Street, Partick, Glasgow.

***Pearl P.S.**—*Pres.*, A. Jaques. *Meetings*, 252, High Holborn, Mondays, 5.45 p.m. *Sec.*, E. G. Watts, 252, High Holborn, London, W.C. 1.

***Perthshire Society of Natural Science.**—*Pres.*, W. Malloch, B.Sc. *Meetings*, Museum, Tay Street, Perth, Second Fridays, November to April, 7.30 p.m. *Sec.*, John Ritchie, Museum, Perth.

***Peterborough P.S.**—*Meetings*, Westgate Schools, Alternate Fridays, 7.30 p.m. *Sec.*, P. G. Field, 79, Taverners Road.

***Photomicrographic Society.**—*Pres.*, Dr. G. S. Sansom. *Meetings*, 4, Fetter Lane, E.C. 4, First and Third Thursdays, from October to May, 7 p.m. *Sec.*, J. G. Bradbury, 1, Hogarth Hill, Golders Green, N.W. 11.

Plymouth Grammar School P.S.—*Pres.*, C. W. Bracken, B. A. *Meetings*, Grammar School, Tuesdays, 4.30 p.m. *Sec.*, R. M. White, M.A., 20, Caprera Terrace, North Road, Plymouth.

***Plymouth Institution and Devon & Cornwall Natural History Society (Photographic Section).**—*Pres.*, Harold Roberts, *Meetings*, Athenæum, George Street, Plymouth, Alternate Mondays from October 1st, 7.45 p.m. *Sec.*, W. Ernest Yandall, 15, Anns Place, Devonport.

***Polytechnic P.S.**—*Pres.*, F. Jackson. *Meetings*, 14, Langham Place, Wednesdays, 7 p.m. *Sec.*, Stanley H. Shand, 117, Park Street, Regent's Park.

***Pontefract P.S.**—*Pres.*, H. Hemingway. *Meetings*, 18, Beastfair, Wednesdays, 7.30 p.m. *Sec.*, S. G. Nicholls, Beechwood Avenue, Pontefract.

Pontypridd and District Y.M.C.A. C.C.—*Pres.*, Ll. Hopkin. *Meetings*, Y.M.C.A., Pontypridd, Alternate Mondays, 7.30 p.m. *Sec.*, R. Llewellyn, Y.M.C.A., Pontypridd.

***Poplar Men's Institute P.S.**—*Pres.*, Capt. Elliot Gorst. *Meetings*, Men's Institute, Hay Currie School, Byron Street, Fridays, 7.30 p.m. *Sec.*, H. J. Broughton, 34, Furzefield Road, Blackheath, S.E. 3.

***Portland.—Easton Red Triangle P.S.**—*Pres.*, C. Daw. *Meetings*, Y.M.C.A. Hut, Reforne, Portland, Mondays, 8 p.m. *Sec.*, H. J. Mayes, 44, Victoria Road, Portland, Dorset.

***Portsmouth C.C.**—*Pres.*, Miss N. K. Shephard. *Meetings*, 1 Middle Street, Southsea, Tuesdays, 8 p.m. *Sec.*, J. Hankins, 47, St. David's Road, Southsea.

***Post Office Savings Bank P.S.**—*Pres.*, A. Hemstock. *Meetings*, Post Office Savings Bank, West Kensington, Alternate Wednesdays, October to March, 4.30 p.m. *Sec.*, F. W. Gates, 115, Ingram Road, Thornton Heath.

***Post Office Stores Department P.S.**—*Pres.*, H. Sparkes. *Meetings*, Post Office Stores Department, Studd Street, First and Third Fridays, 4 p.m. *Sec.*, J. H. Loop, Post Office Stores Department, Studd Street, London, N. 1.

Preston C.C.—*Pres.*, James Nelson. *Meetings*, Stanley Chambers, Lancaster Road, Mondays, 8 p.m. *Secs.*, D. Jones, 4, Rundle Road, Preston, and R. J. Heathman, 239, Tulketh Brow, Preston.

***Preston Scientific Society (Photographic Section).**—Chairman, J. A. Speed. *Meetings*, Lecture Hall, 119A, Fishergate, Tuesdays, 8 p.m. *Sec.*, H. B. Wood, 35, Powis Road, Preston.

Prudhoe and District C.C.—*Pres.*, A. W. G. Dyson. *Meetings*, The Studio, Holyoake Street, Prudhoe, Alternate Thursdays, 7.30 p.m., from October 15th. *Sec.*, J. Leonard, 21, Wilfred Street, West Wylam, Prudhoe-on-Tyne.

Pudsey P.S.—*Pres.*, H. Proctor. *Meetings*, Secondary School, Tuesdays, 7.30 p.m., October to March. *Sec.*, G. A. Wilson, 21, East Terrace, Fulneck, near Leeds, Yorks.

Rawtenstall and District C.C.—*Pres.*, H. Fothergill. *Meetings*, Barley Holme, Crawshawbooth, Wednesdays, 7.30 p.m. *Sec.*, F. E. Aspden, 52, Rock Terrace, Crawshawbooth, Rossendale, Lancs.

***Richmond C.C.**—*Pres.*, G. H. Rodman, M.D. *Meetings*, The Cottage Public Library, Alternate Wednesdays, 8 p.m. October to April. *Sec.*, T. E. Smith, 30, Ellerker Gardens, Richmond.

Ripley and District P.S.—*Pres.*, G. A. Golding. *Meetings*, Market Place, Alternate Wednesdays, 7.30 p.m. *Sec.*, F. Holloway, Lyndhurst Villas, Derby Road, Ripley, Derbyshire.

Rochdale P.S.—*Pres.*, J. White. *Meetings*, Castlemere Central School, Wednesdays, 7.45 p.m. *Sec.*, J. S. Seeley, The Gables, Thornham, Rochdale.

Rodley and District P.S.—*Pres.*, Dr. Bateman. *Meetings*, Society's Rooms, Town Street, Rodley, Thursdays, 7.30 p.m. *Sec.*, Wilson Lord, 20, Petrie Street, Rodley, Leeds.

***Rotherham P.S.**—*Pres.*, Wm. Firth. *Meetings*, Wilfred Street, First and Third Tuesdays, September to April; First Tuesdays, other months, 7.45 p.m. *Sec.*, A. E. Camp, Rinodar, Munsbro' Lane, Greasbro' near Rotherham.

***Royal London P.S.**—*Pres.*, Chas. Humfrey. *Meetings*, Royal London House, Finsbury Square, E.C. 2. *Sec.*, S. E. Norden, Valuation Department, Royal London House, Finsbury Square, E.C. 2.

***Rugby P.S.**—*Pres.*, G. A. Towers. *Meetings*, Percival Guildhouse, occasional Thursdays, 8 p.m., and Saturdays, 7.30 p.m. *Sec.*, F. A. Haigh, 17, Cromwell Road, Rugby.

Rutherglen Amateur C.C.—*Pres.*, R. Guy, *Meetings*, Club Room, Glasgow Road, Wednesday, 8 p.m. *Sec.*, A. Bird, 9, Hillfoot Avenue, Rutherglen.

***St. Bride P.S.**—*Pres.*, A. W. Wyatt. *Meetings*, St. Bride Foundation Institute, Bride Lane, E.C. 4, Mondays, 6.45 p.m. *Sec.*, F. A. Makin, "Ferndale," Alexandra Road, Hemel Hempstead, Herts.

St. Helens C.C.—*Pres.*, Mrs. G. A. Forman. *Meetings*, Y.M.C.A., North Road, alternate Mondays, 7.30 p.m., from October 1st. *Sec.*, Geo A. Forman, 206, Hard Lane, St. Helens.

St. Helens.—Pilkington Staff P.A.—*Pres.*, J. Wolffe. *Meetings*, Grove Street, Mondays, 7.30 p.m. *Sec.*, A. Winstanley, 21, Valencia Bungalows, St. Helens Road, Prescot, Lancs.

St. Pancras P.S.—*Pres.*, Miss Edith Neville. *Meetings*, 36, Tavistock Place, W.C. 1., Mondays, 7.45 p.m. *Sec.*, G. F. Hall, 40, Great James Street, London, W.C. 1.

St. Rollox Co-operative C.C.—*Pres.*, C. McKee. *Meetings*, 38, Weaver Street, Glasgow, Mondays, 8 p.m. *Sec.*, Geo. Thompson, 33, James Orr Street, Glasgow.

Scottish Photographic Circle.—*Pres.*, Robert Crerar. *Meetings*, Institute Rooms, 200, Buchanan Street, Glasgow, First Wednesdays, 7.30 p.m. *Sec.*, W. S. Crocket, 896, Tollcross Road, Glasgow, E. 2.

***Scottish Society of Photographic Art.**—*Pres.*, William Cruickshank. *Meetings*, 5, St. Andrew Square, Edinburgh, First and Third Fridays, 7.45 p.m. *Sec.*, F. C. Diemer, Hendrefoilan, Blackhall, Midlothian.

Selby Scientific Society (Photographic Section).—*Meetings*, Museum Hall, Irregular, 7.30 p.m. *Sec.*, F. H. Harland, 39, Fairfax Avenue, Selby.

Selkirk C.C.—*Pres.*, G. D. Gibson. *Meetings*, Mondays, 7 p.m. *Sec.*, J. Smellie, S. J. R. Club, Selkirk.

Shack Film Society.—*Pres.*, R. P. H Stables. *Meetings*, Golden Fleece Hotel, irregular. *Sec.*, H. Richards, 51, York Road, Loughborough.

***Sheffield P.S.**—*Pres.*, Harold Hill. *Meetings*, 246, West Street, Tuesdays, from October to April, 7.30 p.m. *Sec.*, Miss M. Harrison, 246, West Street.

Sheffield Amateur Cinematographers' Association.—*Pres.*, Dr. J. Pringle. *Meetings*, Winchester House, Fargate, alternate Wednesdays, 8 p.m. *Sec.*, A. D. Hobson, 65, Pingle Road, Hillhouses, Sheffield.

Sheffield and Hallamshire P.S.—*Pres.*, W. Marshall. *Meetings*, Metallurgical Club, 198, West Street, First and Third Mondays, 7.30 p.m. *Sec.*, John H. Marshall, 24, Spring View Road.

Shettleston Co-operative Amateur C.C.—*Pres.*, Wm. D. Carruthers. *Meetings*, 561, Old Shettleston Road, Mondays, 8 p.m., from March. *Sec.*, W. B. Whyte, 631, Shettleston Road, Shettleston, Glasgow, E. 2.

Small Heath P.S.—*Pres.*, J. Walker. *Meetings*, St. Benedict's Church Club Room, Tuesdays, 8 p.m. *Sec.*, W. T. Gavin, 206, Somerville Road, Small Heath, Birmingham.

Smethwick P.S.—*Pres.*, A. J. R. Richards, *Meetings*, Empire House, High Street. Wednesdays, 8 p.m. *Sec.*, H. J. B. Hughes, 72, Francis Road, Edgbaston.

Soho Hill Men's Movement C.C.—*Pres.*, F. W. Birkbeck. *Meetings*, Social Centre, Wretham Road, Handsworth, Wednesdays, 8 p.m. *Sec.*, A. E. Orchard, 12, Claremont Road, Handsworth, Birmingham.

***Southampton C.C.**—*Pres.*, W. Burrough Hill. *Meetings*, 30, Carlton Crescent, Mondays, 8 p.m. *Sec.*, R. T. Bruton, 104, Hill Lane, Southampton.

South-east Essex Photographers, Fellowship of. *Sec.*, R. A. Beeman, 18, Crosby Road, Westcliff-on-Sea.

***South-East Postal Photographic and Art Club.**—*Pres.*, W. A. Adams. *Meetings*, S.E. District Post Office, Fortnightly, 7.30 p.m. *Sec.*, A. V. Mitchell, S.E. District Post Office, London, S.E. 1.

***Southend-on-Sea and District P.S.**—*Pres.*, The Mayor. *Meetings*, Boys' High School, Victoria Circus, Fridays, 7.30 p.m., from October to Whitsun. *Sec.*, Miss M. Coleman, "Robin Hood," Undercliff Gardens, Leigh-on-Sea.

***South Essex C.C.**—*Pres.*, Thos. H. B. Scott. *Meetings*, Manor Park Library, Romford Road, Wednesdays, 8 p.m. *Sec.*, Robert H. Bullen, 170, Browning Road, Manor Park, London, E. 12.

***South London P.S.**—*Pres.*, W. J. Shields. *Meetings*, Central Library, Peckham Road, Mondays, 8 p.m. *Sec.*, A. Lloyd, 181, Brockley Rise, Honor Oak Park, S.E. 23.

Southport P.S.—*Pres.*, A. R. Yarwood. *Meetings*, 11, Hoghton Street, Mondays, 8 p.m., October to March. *Sec.*, J. T. Rigby, 13, Hoghton Street.

***South Shields P.S.**—*Pres.*, Dr. J. Macdonald. *Meetings*, 16, King Street, Tuesdays, 7.30 p.m. *Sec.*, Harrison Burgess, 47, Hawthorne Avenue, Cleadon Park.

***South Suburban and Catford P.S.**—*Pres.*, G. H. Dannatt. *Meetings*, Plough Hall, High Street, Lewisham, Wednesdays 8 p.m. *Sec.*, R. H. Marsh, 43, Woodpecker Road, New Cross, S.E. 14.

***Spen Valley P.S.**—*Pres.*, H. Helliwell. *Meetings*, Healds Hall, Leeds Road, Liversedge, Second and Fourth Thursdays, 7.30 p.m. *Sec.*, A. Pickering, Healds Hall, Leeds Road, Liversedge

Stafford P.S.—*Pres.*, J. D. Jones. *Meetings*, 5, Foregate Street, Tuesdays, 8 p.m. *Sec.*, S. D. Barnwell, Y.M.C.A., Wolverhampton Road, Stafford.

Stalybridge P.S.—*Pres.*, C. H. Moore. *Meetings*, Astley Cheetham Public Library, Fridays, 7.30 p.m. *Sec.*, H. Marchington, St. George's Terrace, Stalybridge.

Stockport P.S.—*Pres.*, H. Ward. *Meetings*, Oddfellows' Institute, Chestergate, Second and Fourth Wednesdays, 8 p.m. *Sec.*, S. Thompson, 57, Vicarage Road, Adswood, Stockport.

Stoke Newington C.C.—*Pres.*, C. Beck. *Meetings*, 15, Amhurst Park, alternate Wednesdays, 8 p.m. *Secs.*, S. E. Smith, 18, Jenner Road, Stoke Newington, N. 16, and A. Miles, 16, Chesholm Road, Stoke Newington, N. 16.

***Stratford.—G. E. R. P.S.**—*Meetings*, Mechanics' Institution, Store Street, Wednesdays, 8 p.m. *Sec.*, W. Reeve, 100, Westwood Road, Goodmayes.

Streatham P.S.—*Meetings*, Last Wednesdays, 8 p.m. *Sec.*, G. H. Smith, 123, Babington Road, Streatham, S.W. 16.

Streatham, West.—St. James' C.C.—*Pres.*, G. E. W. Herbert. *Meetings*, St. James' Parish Hall, Welham Road. *Sec.*, Harold C. Wilkinson, 29, Pendle Road, Streatham Park, S.W. 16.

***Sunderland Photographic Association.**—*Pres.*, Wm. Milburn. *Meetings*, Subscription Library, Fawcett Street, Thursdays, 7.30 p.m. *Secs.*, G. F. I'Anson, 17, Fawcett Street, Sunderland, and F. A. Milburn, 44, Frederick Street.

Swansea C.C.—*Pres.*, Leigh Jones. *Meetings*, Irregular. *Sec.*, E. C. Potter, Channel View, Garden City, Swansea.

***Swansea.—Mond Nickel Works P.S.**—*Meetings*, Mond Recreation Club, alternate Tuesdays, *Sec.*, J. W. Adye, c/o Mond Nickel Co., Ltd., Clydach, Swansea.

***Swindon and North Wilts Field and C.C.**—*Pres.*, Rev. E. H. Goddard, M.A. *Meetings*, The College, Swindon, First and Third Tuesdays, 7.30 p.m., from October. *Sec.*, Miss M. E. Slade, 63, Avenue Road, Swindon.

***Todmorden P.S.**—*Pres.*, Rev. Arthur W. Fox, M.A. *Meetings*, Vale Academy, Wellington Road, Tuesdays, 7.30 p.m. *Sec.*, E. Heard, 7, Fir Street, Walsden.

***Torbay Camera Society.**—*Pres.*, Wm. Rawlings. *Sec.*, Stuart Black, B.A., 1, Cary Place, Torquay.

***Tunbridge Wells Amateur Photographic Association.**—*Pres.*, E. R. Ashton. *Meetings*, Christ Church Parish Room, First and Third Wednesdays, 8 p.m., October to April. *Sec.*, H. F. Winters, 55, High Street.

***Tynemouth (Borough of) P.S.**—*Pres.*, Burdus Redford. *Meetings*, Y.M.C.A., North Shields, Thursdays, 8 p.m. *Sec.*, J. Oliver, Bramerton Cottage, Queen Alexandra Road W., North Shields.

***United Stereoscopic Society.**—*Pres.*, A. T. Mole. *Meetings*, 39, Westbere Road,

West Hampstead, N.W. 2, Second Sundays, from November to April, 6.30 p.m. *Sec.*, A. T. Mole, 39, Westbere Road, West Hampstead, London.

Wakefield P.S.—*Pres.*, A. Ashworth. *Meetings*, Technical College, Thursdays, 7.30 p.m., from October 18th. *Sec.*, G. E. Clayton, 34, Stanley Road, Wakefield.

***Wallasey Amateur P.S.**—*Pres.*, T. Steel. *Meetings*, Earlston Library, Mondays. 8 p.m. *Sec.*, F. H. Lancaster, 22, Laburnum Road, Wallasey, Cheshire.

***Walsall P.S.**—*Pres.*, W. B. Shaw, M.A., B.Sc. *Meetings*, Temperance Hall Annexe, The Square, Mondays, 7.30 p.m. *Sec.*, Chas. G. Wheeley, 42, Camden Street, Walsall.

***Walthamstow and District P.S.**—*Pres.*, S. Bridgen. *Meetings*, Dane Court, Church Hill, Walthamstow, Mondays, 8 p.m. *Sec.*, H. R. Martyn, 37, Goldsmith Road, Leyton.

***Wandgas C.C.**—*Pres.*, F. H. Jones. *Meetings*, "H. E. Jones" Memorial Institute, The Causeway, Wandsworth. *Sec.*, R. McCrae, 25, Huntsmoor Road, East Hill, London, S.W. 18.

***Waterlow's Sports' Association C.C.**—*Pres.*, V. E. Goodman. *Meetings*, Green Hut, Waterlow's Works, Dunstable, Wednesdays, 7.30 p.m. *Sec.*, W. W. Harrowell, 17, Albion Street, Dunstable.

***Watford C.C.**—*Pres.*, E. Smithells. *Meetings*, Public Library. Thursdays, 7.45 p.m. *Sec.*, A. G. E. Smith, 131, Cassiobury Park Avenue, Watford.

Westminster College C.C.—*Pres.*, J. S. Ross, M.A. *Meetings*, Westminster College 130, Horseferry Road, S.W. 1, Thursdays, 9 p.m. *Sec.*, W. T. Quirk, Westminster College, S.W. 1.

Whitley Bay and District C.C.—*Pres.*, C. E. Baldwin, J.P. *Meetings*, 7, Imperial Buildings, South Parade, Whitley Bay, Alternate Thursdays, 8 p.m. *Sec.*, L. Whitfield, 11, Windsor Road, Monkseaton, Northumberland.

***Whitehall C.C.**—*Pres.*, Sir H. J. Wilson, K.C.B. *Meetings*, 6, Richmond Terrace, Whitehall, alternate Tuesdays, 5.45 p.m. *Sec.*, F. M. Chapman, Ministry of Labour, Whitehall, London, S.W. 1.

***Wimbledon C.C.**—*Pres.*, Chas Pullen. *Meetings*, Technical Institute, Gladstone Road, Wimbledon, Thursdays, 7.45 p.m., October to April. *Sec.*, J. H. Reeves, 29, Richmond Avenue, Merton Park, S.W. 20.

***Winchester P.S.**—*Pres.*, Dr. H. C. Highet. *Meetings*, Gudgeon and Sons, Southgate Street, Second and Fourth Tuesdays. *Sec.*, A. E. Rice, 5, Foundry Lane, Winchester.

Wishaw Y.M.C.A. C.C.—*Pres.*, J. Marshall. *Meetings*, Y.M.C.A., Main Street, First and Third Tuesdays, 7.30 p.m., from November 22. *Sec.*, W. Gray, Lochside, Kirk Road.

Wolverhampton P.S.—*Pres.*, H. Holcroft, M.A., F.C.S. *Meetings*, Black and White Chambers, Darlington Street, Twice Monthly, 8 p.m. *Sec.*, J. W. Braithwaite, 30, King Street.

Wolverhampton.—Chillington C.C.—*Pres.*, W. H. Cook. *Meetings*, Chillington Tool Works, Alternate Weeks, from October 30 to February 24, 5.15 p.m., *Sec.*, W. E. Murphy, Chillington Tool Works, Wolverhampton.

Wolverton P.S.—*Pres.*, E. G. Milner, B.Sc. *Meetings*, Technical College, Alternate Mondays, 7.30 p.m. *Sec.*, A. H. Oldham, 10, Clarence Road, Stoney Stratford, Bucks.

***Woodford P.S.**—*Pres.*, Miss D. Norah Cross. *Meetings*, Memorial Hall, High Road, First, Second and Third Wednesdays, 8 p.m. *Sec.*, W. C. Cook, 22, Elmhurst Drive, Woodford, E. 18.

***Woodford.—Bancroft's School P.S.**—*Pres.*, H. C. Playne, M.A. *Meetings*, Physics Laboratory, Thursdays, 4.15 p.m. *Sec.*, Douglas E. Coult, Bancroft's School, Woodford Wells, Essex.

***Woolwich P.S.**—*Pres.*, G. F. Meinertzhagen. *Meetings*, Old Town Hall, William Street, First and Third Thursdays. October to April, 7.30 p.m. *Sec.*, T. D. Nunn, 27, Rectory Place, Woolwich, S.E. 18.

***Worcestershire C.C. and Photographic Survey Society.**—*Pres.*, Rt. Hon. Earl Beauchamp, K.C.M.G. *Meetings*, 1a, High Street, Worcester, Wednesdays, 8 p.m. *Secs.*, Miss L. M. Wilkes, 78, Orchard Street, Worcester, and W. Hodson, 29, Sidbury, Worcester.

***Working Men's College C.C.**—*Pres.*, W. H. Richards. *Meetings*, Working Men's College, Crowndale Road, N.W. 1, Wednesdays, 8 p.m. *Sec.*, J. H. Ellis, Whileaway, Syke Ings, Iver, Bucks.

York Railway Institute C.C.—*Meetings*, Railway Institute, Queen Street, York, Mondays, 7.30 p.m. *Sec.*, E. Rodwell, Hob Moor, Holgate, York.

Postal Clubs.

Abney Portfolios The.—*Sec.*, R. C. Williams, 10, Kitchener Road, Thornton Heath, Surrey,

Albion Postal P.S. (Advanced Workers only).—*Sec.*, Edgar M. Firth, 3, Field Terrace, Bath Road, Worcester.

Amateur Postal C.C.—*Sec.*, W. L. G. Bennett, Kemerton, Lustleigh, Devon.
Amateur Postal C.C.—(Lantern-Slide Section).—*Sec.*, A. J. Wood, The Clydesdale Bank, Aberdeen.
Architectural Postal P.S. for Record, Survey, and Pictorial.—*Sec.*, G. H. Willett, 128, Franklin Road, Kings Norton, Birmingham.
Argosy Postal P.C.—*Sec.*, Rev. C. F. Lowry Barnwell, Stramshall Vicarage, Uttoxeter, Staffs.
Brockwell Postal Photographic Circle, The.—*Sec.*, Charles J. Berridge, 125, Norbury Crescent, Norbury, London, S.W. 16.
Camera Correspondence Club.—*Sec.*, Cyril W. Gardner, 35, Moor View Road, Woodseats, Sheffield.
Circle, The.—*Sec.*, H. W. Honess-Lee, Lynchaford, East Lane, North Wembley, Middlesex.
Civil Service Provincial Portfolios.—*Secs.*, R. B. Ainsworth and W. A. Wood, Ministry of Labour, London, S.W. 1.
Gloucestershire Postal P.S.—*Sec.*, C. Wray Palliser, The Shebeen, Looe, Cornwall.
Landscape Postal Club.—*Sec.*, Basil Schon, St. Winifred's, Walmer.
Lloyds Bank Postal P.S.—*Sec.*, E. C. Warry, Lloyds Bank Limited, Ventnor, I.W.
Nature P.S.—*Sec.*, E. J. Bedford, 11, St. John's Terrace, Lewes.
Perseverance Postal C.C.—*Sec.*, G. F. Ryman, 93, Lower Oldfield Park, Bath.
Photographic Circle.—*Sec.*, George H. Brumpton, 24, Drake Street, Gainsborough, Lincs.
Portrait Folio P.C.—*Sec.*, Duncan Macpherson, 34, Magdala Road, Nottingham.
Postal C.C.—*Sec.*, John MacSymon, 4, Arno Road, Oxton, Birkenhead.
Postal P.C.—*Pres.*, Reginald A. R. Bennett, M.A., *Sec.*, John Rigby, 21, Herefore Road, Southport, Lancs.
Public School and University Postal P.S.—*Sec.*, W. Zurcher, 13, Disraeli Road, Putney, London S.W. 15.
Quarterly Postal C.C. (advanced workers). *Sec.*, Mrs. Maud Oldham, Bellamour Lodge, Rugeley, Staffs.
Railway Postal P.S.—*Sec.*, M. W. Earley, 97, Hamilton Road, Reading, Berks.
Rover Postal C.C.—*Sec.*, John M. Scott, 48, Eglantine Avenue, Belfast.
Silver Plaque Postal C.C.—*Sec.*, Dr. Arthur Gadsden, Newquay, Cornwall.
Somerset Postal P.S.—*Sec.*, P. G. Read, 11B, Clifton Park, Bristol.
Stereoscopic Society, The.—*Sec.*, H. J. Mobbs, 1, Norbury Hill, London, S.W. 16. American *Sec.*, C. W. Culmer, 610, Genesee Street, E. Flint, Michigan, U.S.A. New Zealand *Sec.*, J. D. Richardson, Auckland Savings Bank, 8, Ponsonby Road, Auckland, New Zealand. Australian *Sec.*, H. A. Tregellas, 273, Balaclava Road, Caulfield, North Melbourne, S.E. 7, Australia.
Sunbeam Portfolio Club.—*Sec.*, R. T. Gibbon, 107, Hadley Road, New Barnet, Herts.
Talbot Album Club.—*Sec.*, F. H. Langdon-Davies, 16, Mount Pleasant, Cambridge.
***United Stereoscopic Society.**—*Sec.*, A. T. Mole, 39, Westbere Road, West Hampstead, London, N.W. 2.
Van Chandos Portfolio.—*Sec.*, Van Chandos, 75, St. Quintin Avenue, North Kensington, London, W. 10.
Wesley Guild Pen & Camera Postal Club.—*Sec.*, J. Halliday, 17, Savile Parade, Halifax, Yorks.
Wessex Postal C.C. (Advanced Workers only).—*Sec.*, C. Wray Palliser, The Shebeen, Looe, Cornwall.
Zodiac C.C.—*Sec.*, H. G. Allen, Dunollie, 7, Osborne Road, Ainsdale, Southport.
Zoological P.C.—*Sec.*, Riley Fortune, F.Z.S., Moorlands, Harlow Hill, Harrogate.

Photographic Societies Overseas.

BRITISH DOMINIONS.
(Including Irish Free State.)

Adelaide C.C.—*Pres.*, C. N. Tomlinson. *Meetings*, Institute Building, North Terrace, Second Mondays, 8 p.m. *Sec.*, C. T. Andrews, Institute Building, North Terrace, Adelaide, South Australia.
Adelaide P.S.—*Pres.*, Rev. Canon Murphy. *Meetings*, Society of Arts Rooms, Institute Building, North Terrace, Fourth Mondays, 8 p.m. *Sec.*, R. C. Edwardes, Institute Building, North Terrace, Adelaide, South Australia.
Auckland (N.Z.) C.C.—*Pres.*, Geo. Henning. *Meetings*, Second Thursdays, 7.45 p.m. *Sec.*, H. Lawson, 84, Mt. Eden Road, Auckland, N.Z.
Auckland (N.Z.) Stereoscopic Society.—*Sec.*, J. D. Richardson. Auckland Savings Bank, 8, Ponsonby Road, Auckland, N.Z.
Auckland Amateur Motion Picture Club.—*Pres.*, E. D. Wilkinson. *Meetings*, Tornquist Studio, Coloseum Buildings, Queen Street, alternate Tuesdays, 7.30 p.m. *Sec.*, R. G. H. Manley, P.O. Box 772, Auckland, N.Z.
Canadian Press Photographers' Association (Inc.).—*Pres.*, Chas. G. Roos. *Sec.*, W. H. Bird, 2150, Albert Street, Regina, Saskatchewan.

Canadian Cinema Arts Society.—*Pres.*, Frank E. O'Byrne. *Sec.*, W. H. Bird, 2150, Albert Street, Regina, Saskatchewan.

***Christchurch P.S.**—*Pres.*, W. A. Taylor. *Meetings*, Y.M.C.A., Cambridge Terrace, Second Tuesdays, 7.30 p.m. *Sec.*, L. W. Haxell, 443, Worcester Street, Linwood, Christchurch, N.Z.

Cork Camera Club.—*Pres.*, Prof. H. N. Walsh. *Meetings*, Fortnightly, November to May. *Sec.*, D. J. Ryan, "Cork Examiner" Office, Cork.

Dublin C.C.—*Pres.*, H. M. Dockrell. *Meetings*, Fortnightly, 8 p.m. *Sec.*, J. L. Campion, 12, Mount Shannon Road, S.C. Road, Dublin, W. 5.

Durban Amateur P.S.—*Pres.*, B. M. Narbeth. *Meetings*, Technical College, Second and Fourth Fridays, 8 p.m. *Sec.*, J. R. Walker, Box 2293, Durban, Natal, S. Africa.

Durban C.C.—*Pres.*, B. M. Narbeth, B.Sc. *Meetings*, Jocelyn Leigh-Hunt's Studio, Greenacres Passage, Third Tuesdays, 8 p.m. *Sec.*, Andrew Goldie, P.O. Box 1594, Durban, S.A.

Gordon College Amateur P.A.—*Pres.*, N. L. Watson. *Meetings*, Gordon Institute of Technology, Geelong, Wednesdays, 8 p.m. *Sec.*, J. L. Sharp, 37, Elizabeth Street, Geelong West, Victoria, Australia.

Hamilton (N.Z.) P.C.—*Pres.*, James Treloar. *Sec.*, James Treloar, Bryce Street, Hamilton, N.Z.

Malayan C.C.—*Pres.*, A. Palmer. *Meetings*, Kuala Lumpur, First Tuesdays, 6.30 p.m. *Sec.*, R. A. Stubington, Kuala Lumpur, Federated Malay States.

Melbourne C.C.—*Pres.*, A. E. Stevens. *Meetings*, Rith Hollick Studio, 163, Collins Street, Thursdays, 8 p.m. *Sec.*, L. A. Baillot, "Muriac-a-boo," Dandenong, Victoria, Australia.

***Northern Tasmanian C.C.**—*Pres.*, H. J. King. *Meetings*, Stock Exchange Buildings, 57, Cameron Street, Launceston, Third Wednesdays 8 p.m. *Sec.*, J. R. Elliott, 112, Brisbane Street, Launceston, Tasmania.

Ontario Society of Photographers.—*Pres.*, C. Ashley. *Sec.*, G. P. Freeland, 89, Bloor Street West, Toronto 2, Ontario.

Photographic Society of Ireland.—*Pres.*, Major R. H. Plews. *Meetings*, 3, Burch Quay, Dublin, alternate Thursdays, 8 p.m. *Sec.*, T. H. Scanlan, 18, Morehampton Road, Dublin.

***P.S. of New South Wales (Inc.).**—*Pres.*, J. H. Tindale. *Meetings*, 47, Elizabeth Street, Sydney, Tuesdays, 8 p.m. *Sec.*, R. T. Vance, Box 829, G.P.O. Sydney, New South Wales.

Port Elizabeth Amateur P.S.—*Pres.*, Sydney Theophilus. *Meetings*, Society's Rooms, Athenæum Buildings, First Wednesdays, 8 p.m. *Sec.*, John F. Walsh, P.O. Box 271, Port Elizabeth, South Africa.

Professional Photographers' Association of New South Wales.—*Pres.*, V. Waller. *Meetings*, 182, Pitt Street, Sydney, Third Mondays, 7.30 p.m. *Sec.*, J. P. Farr, 182, Pitt Street, Sydney.

Queensland C.C.—*Pres.*, O. H. Daniels. *Meetings*, Y.M.C.A. Building, Brisbane, Second Tuesdays, 8 p.m. *Sec.*, E. C. Smith, Water Street West, South Brisbane, Queensland.

Southern Tasmanian P.S. (Hobart).—*Pres.*, J. B. Stevens. *Meetings*, Lewis Buildings, Collins Street, Hobart, Alternate Tuesdays, 8 p.m. *Sec.*, Geo. B. Davies, c/o Messrs. Simmons, Wolfhagen, Simmons & Walch, 86, Collins Street, Hobart, Tasmania.

Sydney Camera Circle.—*Pres.*, Harold Cazneaux. *Meetings*, Strand Arcade, Pitt Street, Last Mondays, 8 p.m. *Sec.*, G. J. Morris, 53, George Street North, Sydney, N.S.W.

***Toronto C.C.**—*Pres.*, M. O. Hammond. *Meetings*, Club Rooms, 2, Gould Street, Thursdays, 8 p.m., October to April. *Sec.*, L. H. Fletemeyer, 2, Gould Street, Toronto. Canada.

Wellington C.C. (Inc.).—*Pres.*, Malcolm Ross. *Meetings*, P.C. Watt's Buildings, 250, Wakefield Street, First and Third Wednesdays, 7.45 p.m. *Sec.*, J. L. Stewart, c/o Gray & Sladden, solicitors, Wellington, N.Z.

Western Australia C.C. (Inc.).—*Pres.*, W. Owen. *Sec.*, Will Davies, St. George's House, St. George's Terrace, Perth, W.A.

Whangarei P.S.—*Sec.*, R. R. Roseman, c/o Box 92, Whangarei, New Zealand.

OTHER COUNTRIES.

***Camera Club (The), New York.**—*Pres.*, J. Henry McKinley. *Meetings*, First Thursdays. *Sec.*, H. S. Grinleese, 121, West Sixty-eighth Street, New York City, U.S.A.

China P.S.—*Pres.*, T. T. Ling. *Meetings*, 20, Nanking Road, Shanghai, Saturdays 8 p.m. *Sec.*, Charles Ling, 20, Nanking Road, Shanghai, China.

Copenhagen Amateur P.C.—*Pres.*, C. I. Brodersen. *Meetings*, Club Rooms, Gamle Kongevei 96. October to April.

Foochow P.S.—*Pres.*, Bayonne Ko. *Meetings*, Society's Rooms. *Sec.*, Upstan, Chang Chin Kill Co., South Street, Foochow City, China.

***Kobe Kohakai P.S.**—*Pres.*, M. Hirai. *Meetings*, 265, Sannomiyacho Nichome, First Sundays and Second Mondays, *Sec.*, N. Iwashita, 265, Sannomiyacho Nichome, Kobe, Japan.

Photo Club Brasileiro.—*Pres.*, Dr. L. P. Soares de Souza. *Meetings*, 101, Sete

Setembro Street, Mondays, 9 p.m. *Sec.*, J. Nogueira Borges Fo., 384, Laranjeiras, Rio de Janeiro.

Société Française de Photographie.—*Pres.*, M. général Sebert. Meetings are held at the Society's house, 51, Rue de Clichy, Paris. A general meeting is held on the Fourth Friday of each month at 8.30 p.m. Sectional meetings are held at 9 p.m. The scientific section meets on the First Tuesday, the cinematograph section on the Second Tuesday, the photo-mechanical section on the Third Tuesday, and the colour photography section on the Fourth Tuesday. A Laussedat metrophotography section also holds meetings. Lantern evenings and instructional lectures are also held at various dates. The Acting Secretary, M. E. Cousin, conducts a course of twenty lessons on Monday evenings, at 9 p.m., beginning in January. In conjunction with this course, meetings for practical work are held every Saturday from 2-5 p.m. The Society publishes its monthly, the "Bulletin de la Société Française de Photographie." Hon. *Sec.*, A. Hachette. Acting *Sec.*, E. Cousin, 51, Rue de Clichy, Paris. Members of English photographic societies who may be passing through Paris can obtain cards of invitation to the meetings of the Society and of permission to make use of the Society's dark rooms for the changing or development of plates. The International Salon of Photography is held during the first fortnight of October each year.

Federations of Photographic Societies.

AFFILIATION OF PHOTOGRAPHIC SOCIETIES

With the Royal Photographic Society of Great Britain.

Chairman of Executive Committee.—J. J. Butler, *Secretary.*—H. H. Blacklock, 35, Russell Square, London, W.C.

The Affiliation publishes an annual "Red Book," containing a list of Affiliated Societies and other particulars. The Red Book has been officially recognised as a permit to photograph in certain places.

Advantages of affiliation are as follows: The loan of illustrated lectures on photographic and kindred topics, sets of lantern slides, etc.

Each Society is entitled to as many copies of the Red Book as it may require at the price of 3d. each.

One copy of each issue of the *Photographic Journal*, in which are published the transactions of the Royal Photographic Society, and the proceedings of the Affiliation.

Participation in the annual competitions of the Affiliation.

Any Affiliated society may send prints or slides entered for its competitions to be judged by one or more of the board of judges. If the board is not able to meet for the purpose, the executive committee will appoint a judge or judges.

Temporary use of the accommodation provided by the various Affiliated societies to members away from their own localities.

Free admission on one evening to the annual exhibition of the Royal Photographic Society on production of the Red Book. On showing the Red Book, members of Affiliated societies and their friends may obtain admission to the Royal Photographic Society's Exhibitions, where fees are charged, at half price.

Members of Affiliated societies joining the Royal Photographic Society are exempted from the payment of entrance fee.

Selected prints from the annual print competitions form house exhibitions at 35, Russell Square. The exhibitions are open to all members of Affiliated societies.

An annual combined "outing" of members of Affiliated societies, is held in the summer, and an annual dinner takes place each year.

A model entry form with rules has been compiled by the executive committee, and copies may be had from 35, Russell Square.

CIVIL SERVICE.

President.—Sir H. Maxwell-Lyte, K.C.B. *Secretary.*—F. M. Chapman, Ministry of Labour, 6, Richmond Terrace, Whitehall, London, S.W. 1. The Federation consists of 9 societies. There is also a Postal Club.

EAST ANGLIAN.

President.—Bertram Cox. *Secretary and Treasurer.*—P. G. Field, 79, Taverner's Road, Peterborough. The Federation consists of 12 societies.

INTER-CLUB PHOTOGRAPHIC ALLIANCE.

President.—J. J. Hartley. *Secretary.*—Geo. R. Bradford, 77, Ruskin Avenue, Colne. *Secretary* (Print Section).—H. Hardaker, 17, Ridge Street, Todmorden. *Secretary* (Lantern Slide Section).—C. H. Taylor, 2, Lever Street, Todmorden.

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Nelson, Lancs. *Secretary* (Travelling Exhibition Prints).—T. Lee Syms, 69, Castle Street, Tyldesley. *Secretary* (Lantern Slide Section).—J. Kershaw, 20, Lord Street, Stalybridge. *Secretary* (Print Portfolio Section).—H. L. Hadfield, Loxley House, King Street, Dukinfield. A Year-Book is published, with a list of societies, lecturers and demonstrators, judges for exhibitions, etc. The Union consists of 43 societies.

MIDLAND COUNTIES.

President.—W. Bailey. *Secretary.*—J. S. Lancaster, 144, Middleton Hall Road, King's Norton, Birmingham. *Secretary* (Portfolio and Lantern Slides).—F. Green, Monaco, Victoria Road, Acocks Green, Birmingham. The Federation promotes the Midland Salon of Photography and consists of 40 societies.

COUNCIL OF BRITISH PHOTOGRAPHIC FEDERATIONS.

President.— Alex. Keighley, Hon. F.R.P.S. *Secretary.*—J. S. Lancaster, 144, Middleton Hall Road, King's Norton, Birmingham.

NORTHERN COUNTIES.

President.—Robert Chalmers, F.I.C. *Secretary.*—N. R. Palmer, Social Club, Hetton-Le-Hole. *Secretary* (Competitions)—A. Leonard Hitchin, 19, Wolveleigh Terrace, Gosforth. *Secretary* (Travelling Exhibition Prints)—Harrison Burgess, 16, The Crescent, Cleadon Park, South Shields. The Federation consists of 13 societies. A Year-Book is issued.

SCOTTISH.

President.—A. J. Wood, Aberdeen. *Secretary.*—James W. Mackenzie, Trynlaw, Strathaven. *Secretary* (Portfolio).—George Raeper, 8, Lindsay Road, Leith. *Secretary* (Lantern Slide).—Miss H. M. Bailey, 63, Watson Street, Aberdeen. The Federation promotes the Scottish Photographic Salon and consists of 51 societies.

(*Glasgow District Union.*)

President.—D. McLachlan. *Secretary.*—R. Marshall, 69, Edington Street, Glasgow. The Union consists of 18 societies.

YORKSHIRE UNION.

President.—Alex Keighley. *Business Secretary.*—H. Storey, 119, Moorside, Armley, Leeds. *Secretary* (Lantern Slide Section).—W. Cadman, Hazeldene, Hall Lane, Liversedge. *Secretary* (Print Portfolio Section).—S. Greenwood, Summerfield, Hebden Bridge. *Secretary* (Challenge Trophy and Shield Section).—E. Mennell, 10A, Spring Street, Hull. The Union consists of 30 societies.

Survey and Record Societies.

BRISTOL.

President.—O. R. Langley. *Secretary.*—Mordaunt Miller, 7, All Saints Road, Clifton, Bristol.

EXETER.

President.—The Mayor. *Secretaries.*—F. R. Rowley and H. Tapley-Soper. Number of prints (housed at the University College and City Library), 2,000.

KENT.

Secretary.—H. E. Turner, B.A., B.Sc., 3, Carlton Road, Tonbridge Wells. Number of prints (housed at the Museum, Maidstone) about 2,000.

LEYTON AND LEYTONSTONE.

President.—C. Smith. *Secretary.*—Miss E. Drake, 4A, Carlton Villas, Barclay Road, Leytonstone, E. 11.

LYNN AND NORFOLK.

Secretary.—H. J. Rennie, Stanley Public Library, King's Lynn. Number of prints (housed at the Stanley Public Library, King's Lynn), 800.

NORFOLK AND NORWICH.

President.—Russell J. Colman, D.L., J.P. *Secretary and Curator.*—Geo. A. Stephen, F.L.A., City Librarian, Central Public Library, Norwich. Number of prints (housed at Central Public Library, Norwich), 4,948. Also 2,250 lantern slides. A leaflet giving full particulars of scheme and of subjects included may be obtained from the Secretary.

SURREY.

President.—Lord Ashcombe, Lord Lieutenant of Surrey. *Hon. Secretary.*—G. Parkhouse, 70, Beckenham Road, Beckenham. Number of prints (housed at Public Reference Library, Croydon) about 8,000. Also 1,700 lantern slides.

SUSSEX.

Hon. Secretary.—F. Harrison, M.A., 44, Market Street, Brighton. *Hon. Curator.*—Henry D. Roberts, M.B.E., The Public

Library, Brighton. *Hon. Treasurer.*—J. S. North, 44, Market Street, Brighton. Number of prints (housed at Public Library, Brighton), 3,000. Also 500 lantern slides and over 1,500 negatives.

WORCESTERSHIRE.

Secretary.—A. J. Woodley, 1A, High Street, Worcester. Number of prints (housed at Victoria Institute, Worcester), 780.

Photographic Bodies.

Under the above headings are arranged particulars of the chief photographic associations which cannot be appropriately included in the list of photographic societies.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

President.—Angus Basil (London). *Past President.*—Archibald Fairbairn. *Hon. Treasurer.*—Richard N. Speaight. *Members of Council.*—London: Marcus Adams, Valentine Bibbs, Archie Handford, W. E. Gray, Reginald Haines, George Hana, H. M. King, R. Lang Sims, G. Marshall Smith. Country; Frank Brown (Leicester), Ernest Care (Eccles), A. H. Ll. Chapman (Swansea), Thos. Chidley (Chester), Pelham P. Crowe (Reading), W. Fisk-Moore (Canterbury), G. N. Futcher (Southsea), R. Hawkins (Brighton), John Mills (Northampton), John Short (Nottingham), A. Swan Watson (Edinburgh), Harry J. Whitlock (Birmingham), H. D. Halksworth Wheeler (Folkestone).

Secretary.—Alfred Ellis, 2, Vinery Villas, Hanover Gate, London, N.W.1.

BELFAST AND NORTHERN IRELAND PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

President.—R. Clements Lyttle. *Committee.*—Messrs. J. R. Bainbridge, Charles Haig, and Miss Dorothy Horton. *Secretary.*—Geo. F. Webb, 63, North Street, Belfast.

BIRMINGHAM PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

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Secretary.—E. J. Edwards, 8, Cherry Street, Birmingham.

BRISTOL AND DISTRICT PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

President.—A. G. Wager. *Vice-President.*—Miss G. M. Brownlee (Bristol). *Treasurer.*—V. H. Turl, 81, Whiteladies Road, Bristol. *Committee.*—W. Bellamy (Weston-super-Mare), S. W. Bell (Frome), A. G. Bolwell (Bath), Miss K. Chivers (Bristol), Mrs. Hamilton (Bristol), C. Howe (Bath), Miss Knight-Adkin (Bristol), A. E. Stanley (Bristol). *Secretary.*—J. H. Brombead, Merchants Road, Clifton, Bristol.

DEVON AND CORNWALL PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

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EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

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GLASGOW AND WEST OF SCOTLAND SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

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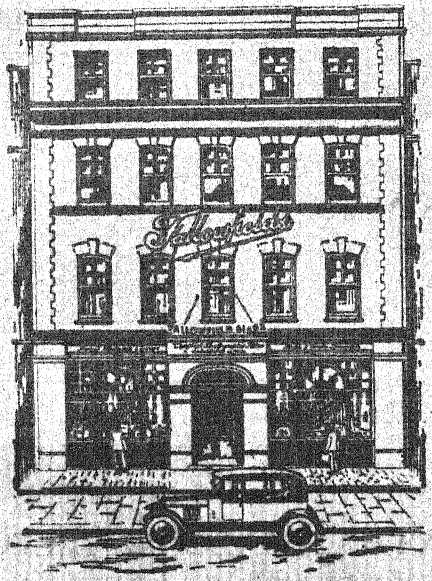
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DR. SAMUEL JOHNSON

The feature of the past year has been the great development of amateur kinematography. So that our friends may be better able to judge the respective merits of the various cameras and projectors on the market—the best of which we stock—we have fitted up a first-class projection room in which we are always pleased to show customers the possibilities with various pieces of apparatus or the results of their work, and also to demonstrate all types of enlarging and projection apparatus.

We must thank all our old friends who have followed us to Charing Cross from the Haymarket, and particularly those from other lands, who would find us even when they had mislaid our notice regarding the change of address. We are happy to think that we have not lost a customer by the change, but are fortunate to have added many new ones. We greatly appreciate the kindly expressions we are constantly receiving from those who favour us with their orders.



The Ground Floor, 9-10 Charing Cross

Our Service. The name of Sinclair is synonymous with quality, and we are always ready to help and advise our friends concerning apparatus and materials of our own or other manufacturers. All goods advertised in this Almanac may be purchased from us.

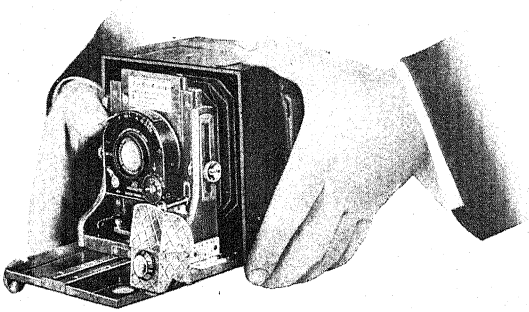
Clients Abroad. Our large export trade has been built up by careful attention to Foreign orders. We realise that any error takes a long time to rectify and every care is taken in testing apparatus before shipment.

Developing and Printing Service. Our works at Brixton are in delightful surroundings, and we aim at the best work at the lowest possible price. The Sinclair Service in this department has always been recognised as the best.

Ophthalmic Department. We have a special department for eye-glasses and spectacle fitting, and stock all the latest aids to perfect vision. Oculists' prescriptions have every care and attention, for we realise that a perfect fitting frame is as important as the lenses it contains.

SINCLAIR LONDON

The SINCLAIR "UNA"



1929 Model with "UNA" Tilting Finder, scaled to agree with the Rising Front of the Camera.

Showing Standard "Una" with normal extension and Tilting Finder, with Rising Front in Action.

Striking comment of an officer of the MOUNT EVEREST EXPEDITION

He writes:

"During the Expedition I gave up using my own Camera, and used entirely one of your 'Una' Cameras we had with us; as I was so taken with the absence of unnecessary movements, and consequent rigidity of the instrument."

Some Press Comments

"Of the 'Una' Camera as an instrument of the best design and workmanship we have occasion to speak in the highest terms. Though it is equal to the widest range of work, it is an instrument of few movements and working parts."

The British Journal of Photography.

"Simplicity of design, combined with efficiency of movements and soundness of construction, are the leading points."—Morning Post.

Although it is a good many years since the Sinclair "Una" was placed upon the market it has never been surpassed for the excellence of its workmanship, and still holds its position as the **best British Camera for Hand and Stand Photography.**

WHY THE "UNA" WINS WORLD-WIDE PRAISE

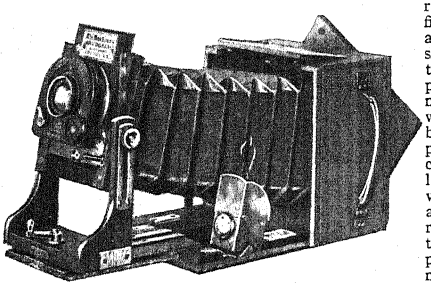
1. **Because of its workmanship.** Our aim is to make a thoroughly good instrument, perfect in every detail.
2. **Because of its simplicity.** We have introduced the movements required by the practical worker and omitted those that are rarely used and impair efficiency.
3. **Because of its design.** We have given the greatest consideration to the points usually overlooked in camera construction. The design of the rising front, swing front and revolving back is such as to ensure the maximum rigidity when they are in use.
4. **Because of its capacity.** The "Una" is capable of doing everything. It can be fitted with any lens, any form of shutter and any style of plate or film-changing mechanism.

SINCLAIR LONDON

THE SINCLAIR "UNA"—*continued.*

The Standard "UNA."

ITS APPEARANCE. The Standard "Una" when closed appears as a compact box, covered with fine hard-grain morocco leather. When the camera is opened and the front is extended, as in the illustration, the inner woodwork is seen to be of fine polished mahogany with brass fittings, all finished in the best possible style. The bellows is of leather, of long extension, and is particularly deep at the front to allow of a great range in rising front movement. It will be noticed that when the camera is held in the hand ready for use, the level, finder and focussing scale are all on the left-hand side and in close proximity to one another—a small point, but one of the utmost importance in actual work. Focussing is done by means of a rack and pinion focussing screw with cross rack to prevent backlash, and this, together with the shutter release, is actuated by means of the right hand. The feature that particularly impresses anyone who has not had experience with the "Una" Camera is the extraordinary rigidity of the front, and it is this that has made the "Una" so popular amongst well-known experts in tele-photography, such as Captain Owen Wheeler and the late Dr. Atkin Swan. It was selected by the Royal Geographical Society for the Mount Everest Expedition. With modern anastigmat lenses the importance of a rigid front is frequently overlooked. In the Sinclair "Una" we have not sacrificed efficiency for the sake of an ounce or two in the weight.



The Standard "Una," showing front raised and tilted, and revolving back.

The Sinclair "Una," instead of a detachable reversing back, has a revolving back that may be instantaneously changed from the upright to the horizontal position, even after the shutter of the dark slide is drawn and the plate is ready for use. On the revolving back is a deep hood, which may be quickly removed from the ground glass by pressing a couple of springs, should the hood not be required for any particular work.

The Sinclair "Una" front is solidly made with a firm base which can be instantaneously clamped to the baseboard. We do not use any clips or springs to hold the front when the camera is brought out to the infinity mark, because in our opinion such spring clips, although perhaps very fairly effective when a camera is new, are likely to soon wear and they militate against the rigidity that is possible when the base of the front is tightly clamped to the base of the camera.

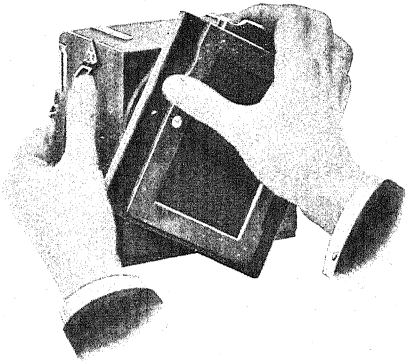
THE SINCLAIR RISING AND SWING FRONT. An important feature of the "Una" is the enormous range of Rising Front movement, and this rising front action is quite independent of the swing front. It will be found in practical work that the rising front is the first movement that the worker requires, particularly with modern anastigmat lenses. The extent of the rising front movement will be found below. The Swing Front is an action more rarely required, and with the "Una" the swing front action is a central swing, and the importance of a central swing will be greatly appreciated by all expert photographers. It permits of the foreground being rendered perfectly sharp at the same time as the more distant objects when using a large aperture lens.

SINCLAIR LONDON

THE "UNA" EXTENDING BASEBOARD. The Standard "Una" has Double Extension, and this is sufficient to allow objects to be copied the same size with the lens usually fitted, and also permits the single half of combinable lenses to be used for distant photography. This extension is also of great value in telephotographic work. A Triple Extension pattern is also made.

THE FOCUSSING SCALES. These are of real ivory and divided into yards, not into an odd number of feet, which are exceedingly difficult to judge. In practice yards correspond with strides and will be found very easy to estimate.

A "DEPTH OF FOCUS SCALE," indicating the depth of focus obtained with various stops, is also fitted.



The Revolving Back of the Sinclair "Una."

THE SINCLAIR "UNA" REVOLVING BACK. This very important improvement on the old reversing back will be generally appreciated. The plate can be at once changed from the vertical to the horizontal position without removing the back of the camera, and this may be done while the plate is exposed in the slide ready for use. The back of the camera with the slide *in situ* revolves on a light-tight turn-table.

THE "UNA" DOUBLE PLATE HOLDERS. The "Una" Plate Holders differ materially from other plate holders apparently similar in design, and we have no hesitation in stating that for all but colour work they are far superior to the best book-form slides. For colour plates we supply specially designed book-form slides fitted with improved light tight valves and draw-out shutters. The features of the "Una" Slide are:—

1. The quality of the pull out shutters, which are of the **finest hard rubber.** It is very rarely these shutters break, and they can be recommended for tropical use.
2. The valves in the plate holders where the shutters enter are made with the greatest care and ensure a more light-tight fitting than is possible with book-form slides.
3. Each plate holder is fitted with Auto-Safety Catches to obviate double exposure.

THE LEVELS. All cameras are fitted with Levels, the position selected being near the finder and focussing scale.

THE GROUND GLASS SCREEN is covered with a Focussing Hood, so arranged that it can be removed in a moment should a focussing cloth or focussing glass be preferred.

THE FINDER. An important part of the "Una" Outfit is the Sinclair Tilting Finder. With most hand cameras the finder is quite worthless when the rising front is in action, and without the rising front it is impossible satisfactorily to photograph subjects in which buildings appear. Our contention is that as good work should be done in the hand as can be done on a tripod, and this is only possible with such a finder as ours. When taking a picture the camera is held level as judged by the spirit level, the finder is then tilted to get the view desired, after which the scale on the rising front is adjusted to agree with the scale on the finder. The exposure is then made,

SINCLAIR LONDON

LENSES. The best camera needs the best lens, and the best lens is of little value without a perfect camera. The late war proved that the boasted superiority of some foreign lenses was an idle myth, and we use those British made lenses whose worth has been proved.

SHUTTERS. On the smaller size cameras we use the "N.S." perfect Shutter (see Page 510). The "N.S." Shutter has not the aggravating jump in speed which is such a feature of most diaphragmatic shutters, but is at present only made in small sizes. With other makes, as fitted to the larger lenses and cameras, we advise having the speeds tested at the National Physical Laboratory.

THE TROPICAL STANDARD "UNA"

THE TROPICAL STANDARD "UNA" is exactly the same design as the regular pattern, but it is made of selected mahogany, brass screwed or bound, and polished on the outside instead of being leather covered. We do not make our cameras in teak, because our experience is that teak is quite unsuited for hot and dry climates.

DETAILS OF STANDARD MODELS

Ins.	Size closed without hood	Extension	Weight with screen but without hood	Extent of rising front	Thickness of hood	Weight of hood
$3\frac{1}{2}\times2\frac{1}{2}$ or $9\times6\frac{1}{2}$cm.	$4\frac{3}{4}\times3\frac{1}{2}\times5$	$9\frac{1}{2}$ in.	1 lb. 10 ozs.	$1\frac{1}{2}$ in.	$\frac{1}{4}$ in.	$1\frac{1}{2}$ ozs.
$4\frac{1}{4}\times3\frac{1}{4}$	$5\frac{3}{4}\times3\frac{3}{4}\times6$	$11\frac{3}{8}$ „	2 „ 6 „	$2\frac{1}{2}$ „	$\frac{3}{8}$ „	$2\frac{1}{2}$ „
5×4	$6\frac{1}{2}\times4\frac{1}{4}\times6\frac{3}{4}$	$12\frac{3}{4}$ „	2 „ 15 „	$2\frac{3}{4}$ „	$\frac{3}{8}$ „	3 „
$5\frac{1}{2}\times3\frac{1}{2}$	$7\times4\frac{1}{2}\times7\frac{1}{4}$	$13\frac{1}{2}$ „	3 „ 12 „	3 „	$\frac{3}{8}$ „	3 „
10×15cm.	$7\frac{3}{8}\times4\frac{1}{4}\times7\frac{5}{8}$	$13\frac{3}{4}$ „	4 „ 2 „	3 „	$\frac{3}{8}$ „	$3\frac{1}{2}$ „
$6\frac{1}{2}\times4\frac{3}{4}$	$8\times4\frac{1}{2}\times8\frac{1}{4}$	$15\frac{1}{2}$ „	4 „ 8 „	$3\frac{1}{2}$ „	$\frac{1}{2}$ „	4 „
7×5 or 13×18 cm.	$8\frac{5}{8}\times5\times9$	17 „	4 „ 12 „	4 „	$\frac{1}{2}$ „	$4\frac{1}{2}$ „

The "UNA" for High-power Tele-photography.

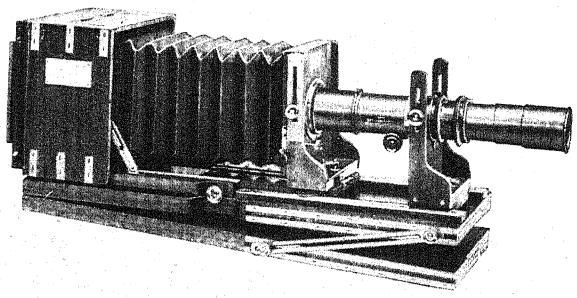


Illustration of Standard Tropical Model "Una" Camera, supplied to H.M Government, complete with Atkin-Swan Tilting Table and Telephoto Lens.

SINCLAIR LONDON

PRICES

STANDARD MODEL "UNA" CAMERA, with "Una" Tilting Finder scaled to agree with rising front on camera, Level, Focussing and Depth of Focus Scales. Three Double Plate Holders, "N.S." Perfect or other suitable diaphragmatic Shutter and fitted with lenses as follows:—

Lenses	3¼×2½ and 9×6½cm.	¼-plate	5×4 or 9×12cm.	10×15cm. or 5½×3½	½-plate	7×5 and 13×18cm.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Ross Homocentric F/6.8	21 10 0	23 0 0	26 10 0	27 0 0	32 10 0	36 10 0
Ross Xpres, F/4.5	23 10 0	26 10 0	29 0 0	32 0 0	36 10 0	41 10 0
*Ross Combinable, 2 foci, F/5.5 and F/11 ..	28 0 0	31 10 0	34 10 0	37 10 0	42 0 0	46 10 0
Dallmeyer 'Perfac' F/6.3	20 0 0	22 0 0	25 0 0	25 10 0	31 0 0	34 10 0

* These prices include Cameras with Triple Extension.

TROPICAL MODELS. Extra on above prices.

£3 10 0 £3 10 0 £4 0 0 £4 0 0 £4 0 0 £4 0 0

Triple Extension on Standard and Tropical Models, **£2 0 0** extra on all sizes

Accessories for "Una" Cameras

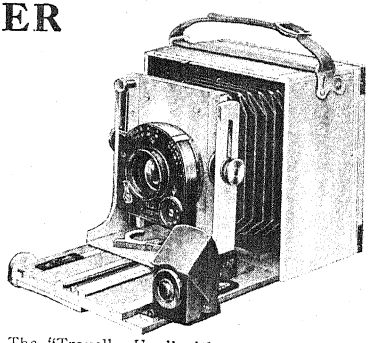
	3¼×2½ and ¼-plate	5×4 or 9×12cm.	10×15cm. or 5½×3½	½-plate	7×5 and 13×18cm.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Extra Double Plate Holders .. .. each	1 2 6	1 8 0	1 11 6	1 17 6	2 2 0
Extra Tropical Spanish Mahogany Plate Holders .. .. each	1 7 6	1 13 0	1 16 6	2 2 6	2 7 6
Special Book-form Plate Holders, suitable for Autochrome, Agfa, or ordinary Plates ..	2 2 0	2 7 6	2 10 0	2 15 0	3 0 0
Ditto, Tropical Model ..	2 7 0	2 12 6	2 15 0	3 0 0	3 5 6
Leather covered Film Pack Adapter .. each	2 5 0	2 10 0	2 15 0	3 0 0	3 10 0
Ditto, Tropical Model ..	2 15 0	3 0 0	3 5 0	3 10 0	4 0 0
Hand-sewn Leather Case, with lock and key, to hold Camera and three Slides	3 5 0	3 15 0	4 0 0	4 15 0	5 5 0
Ditto, for Camera and six slides	3 15 0	4 5 0	4 15 0	5 10 0	6 0 0
Web-sling Shoulder Strap for Camera Case ..	0 10 6	0 10 6	0 10 6	0 10 6	0 10 6
		5×4	5½×3½		
Graflex Roll Holder including fitting	4 15 0	5 5 0	5 5 0	—	6 2 6
Ditto, Tropical Model ..	6 6 0	6 16 0	6 16 0	—	7 15 0

Atkin-Swan Tilting Table, for use with high power Telephoto Lenses
Price for all sizes (illustrated on page 504) **£7 10 0**

SINCLAIR LONDON

The SINCLAIR "TRAVELLER UNA"

is a Metal Camera of the Highest Class. $3\frac{1}{2} \times 2\frac{1}{2}$ ($9 \times 6\frac{1}{2}$ cm.) with Ross Combinable Lens (2 foci) and "N.S." Perfect Shutter



The "Traveller Una" with normal extension as used with the combined lens.

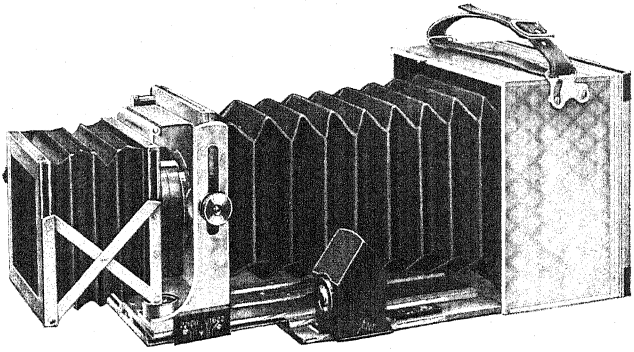
The "TRAVELLER UNA" is built on the same lines as our Standard and Tropical Models, and is particularly suited for Explorers and Scientists who require an instrument to stand the roughest wear and tear. It is made of Duralumin—a metal nearly as light as aluminium but without any of its drawbacks, and is very beautifully finished. It is as well adapted for hand as for stand use, and the lens fitted is perhaps the most generally useful lens made for the practical worker, because not only is it very rapid (F.5.5) but the single elements working at F.11 give a very practical telephoto effect when photographing distant objects such as mountains, etc.

In this camera we have not hesitated to add a little extra weight so that perfect rigidity is secured when fully extended, either when copying objects the same size or if used for telephoto work. The camera is fitted with two scales, one for the combined lens working at F.5.5, and the other for the single lens working at F.11. It has a tilting finder marked down to show the view given by the combined and single lens. This finder is scaled to show the amount of foreground cut out when the rising front of the camera is in use, and a level is also fitted.

SINCLAIR LONDON

The SINCLAIR "TRAVELLER UNA"

(continued)



The "Traveller Una" with double extension and with Sinclair Lens Hood on front.

The shutter is the " N.S." PERFECT Shutter, giving the speeds required by the practical worker, viz. : from $\frac{1}{2}$-second to 1/100th second, as well as " Time " exposures.

The " TRAVELLER UNA " with its shutter and optical equipment is only sold as a complete unit, and it cannot be supplied without lens or shutter, although other supplementary and Telephoto Lenses can be added to the outfit when desired.

The " TRAVELLER UNA " measures $4\frac{5}{8} \times 3\frac{1}{8} \times 4\frac{5}{8}$ in. (11.7 × 8 × 11.7 cm.). The extension is 10 in. (25 cm.), and the weight, including lens and shutter, is 3 lbs. (1.36 kilos).

The Price of the Outfit complete, including Lens and Shutter as described, and three Tropical Model "UNA" Plate Holders £35

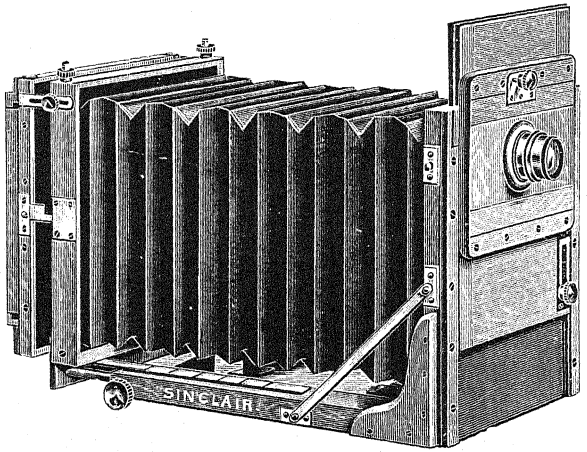
Extra for Sinclair Lens Hood as illustrated **25/-**

Film Pack Adapters and other Accessories can be fitted as listed on Page 505.

SINCLAIR LONDON

The Sinclair "Technical" Camera

As supplied to The War Department, His Majesty's Indian Government; The New South Wales Government; The Crown Agents for the Colonies; Southern Rhodesia; The Siamese Government; The Egyptian Government; Engineering Works and Scientific Institutions.



This Camera in its general character is of the square bellows long-focus type but has a number of improvements in design, making it the most efficient of its class and particularly suitable for Professional, Technical and Scientific work. It is made of the best seasoned Spanish mahogany, and great care is taken to ensure parallelism between front and back, an important matter with modern anastigmat lenses.

THE RISING AND FALLING FRONT. As will be seen from the illustration there is a very **great rising front movement,** and there is an **equally great falling movement.** This is attained by means of a moving panel at the back of the rising front, and which may be adjusted so that either a great rise or a great fall is secured.

THE SWING BACK. A central swing is provided, and the arms are as long as possible, so that the greatest range of movement may be obtained. By means of the clamping screws on the top of the camera a side swing can also be obtained for special work.

	6½ × 4¾	8½ × 6½	12 × 10	15 × 12
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Camera and 3 Double Dark Slides	**24 0 0**	**30 0 0**	**40 0 0**	**50 0 0**
Ditto, Brass Bound	**27 10 0**	**34 0 0**	**45 10 0**	**56 10 0**
Extra Double Slides .. each	**2 10 0**	**2 15 0**	**4 10 0**	**6 0 0**
Extra Brass Bound Double Slides ,,	**3 0 0**	**3 5 0**	**5 5 0**	**6 17 6**

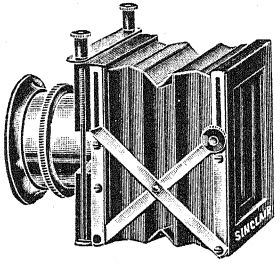
Messrs. COLE, MARCHENT & MORLEY, Ltd., Prospect Foundry, Bradford, write:—"We congratulate you on the careful attention shown to a number of details which are often omitted."

JNO. B. SCRIVENOR, Esq., Government Geologist, Federated Malay States, writes:—"The whole-plate camera gives every satisfaction."

SINCLAIR LONDON

The "SINCLAIR" *Adjustable* LENS HOOD *and* SCREEN HOLDER

PREVENTS FOGGY NEGATIVES



Lens Hood open.



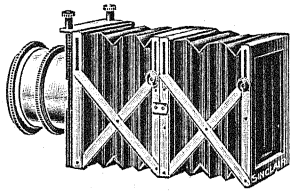
Closed.

A Typical Testimonial

Sheffield,
March, 1920.

Lens Hood to hand. It is a beautiful piece of workmanship and very efficient. I have already used it with great success.

W. F. A.



"The practical photographer will be wise in regarding this accessory as an indispensable part of his equipment."
British Journal of Photography.

Hood with Extension for Tele-photography.

No one who has once used the bellows hood of this form is likely to expose another plate without it. It enormously increases the brilliancy of the result and permits of photographs being taken against the sun, which would otherwise be impossible. This new type of Sinclair Lens Hood is not only adjustable as regards the extension, but also in its range for fitting to the hoods of lenses, and consequently the same lens hood will fit a large number of lenses, and the vice grip permits of it being securely held in position. Each hood is also fitted with a spring screen holder, permitting screens to be instantly changed or removed. The same screen will therefore suffice for any lenses which the hood will fit, and the necessity for special caps or screw-in cells is obviated. In cases where lenses are fitted to shutters or are in sunk mounts, a small metal hood to screw into the front cell of the lens may be necessary, which we, or any maker or dealer, would supply.

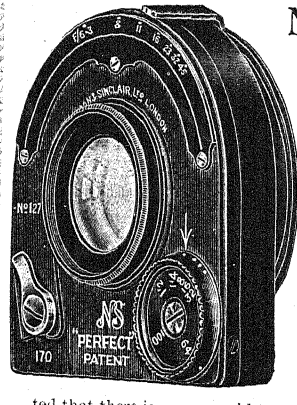
Size	Adjustable to fit Hood of Lenses from	Extension up to	Size closed	Price	KI, KII or KIII Screen to fit
No. 00 ..	1 to 1½ ins.	2¾ ins.	3 × 2¼ × 1	**25/-**	**5/9**
No. 1 ..	1½ to 2 ins.	2¾ ins.	3¾ × 3 × 1½	**30/-**	**7/6**
No. 2 ..	2 to 2½ ins.	3 ins.	4½ × 3½ × 1½	**35/-**	**9/6**
No. 3 ..	2¼ to 3 ins.	4 ins.	5½ × 4¼ × 1⅝	**57/6**	**13/9**
Large Hood	Opening 5⅛ × 4	5¾ ins.	5½ × 7 × 1¼	**60/-**	—

For Studio and Kine' Cameras.

Collapsible Extensions may be had for Nos. 1 and 2 and these increase the lengths when open to 4¾ and 6 inches respectively. Such extensions cost for No. 1 **20/-** and No. 2, **25/-**. They are very advisable for Tele-photography.

SINCLAIR LONDON

THE "N.S." SHUTTER



Newman-Sinclair Patent

The only Shutter giving the range of speeds required by the pictorial worker.

NO VIBRATION

GREAT EFFICIENCY

SMOOTH IN ACTION

The "N.S." Patent Shutter has been designed for the use of workers who want a shutter on which the engraved speeds approximate to the actual ones. It is well known that the types of diaphragmatic shutters in general use are very defective in this matter. They are made by the thousand, and dial plates cast or engraved in quantity are fitted without any relation whatever to the real speeds. As a general rule Continental shutters are so constructed that there is a very rapid transition from slow to quick speeds, quite irrespective of the markings on the shutter, and we may get an alteration in the speed from 1/8th to 1/70th of a second with only the slightest movement on the speed dial.

The Accuracy of the "N.S." Shutter. Unless the photographer has a shutter of which the speeds are approximately correct, bad work is inevitable. The "N.S." Patent Shutter is so constructed that the above-mentioned defect is non-existent and in its manufacture we have endeavoured to give those speeds that are the most useful for the practical photographer. Moreover **each shutter is individually tested for speed, and each dial plate is separately engraved.** The speeds we set the shutter at are those that work conveniently with the lens apertures The shutters are engraved 1/2, 1/4, 1/8, 1/16, 1/32, 1/64 and 1/100th of a second; and the speeds that will be found of the greatest use to the hand camera worker are 1/8, 1/16 and 1/32 of a second, the latter being fast enough for all ordinary moving street traffic. Intermediate speeds between any of the two engraved speeds can be given if desired, and also "Time" exposures. The shutter may be opened for focussing without the necessity for changing the speed dial.

The Efficiency of the "N.S." Shutter. The "N.S." Accurate Shutter has surprisingly high efficiency owing to the fact that it opens and closes quickly and remains full open for the greater proportion of the indicated exposure.

The Release. The Shutter has a hand release which is in the most convenient position for work when the shutter is fitted to a camera, the fingers being then below the baseboard and the thumb used to actuate the release. An Antinous release may be used, and this is screwed into a hole just below the hand release pin. This convenient position does not get in the way of any movements and allows such a release to be shut up inside the camera when desired.

	Iris Aperture	Tube Diameter for Lenses	Price
No. 0 Size	7/8"	1-1/16"	**£4 0 0**
No. 1 „	1"	1-3/8"	**4 0 0**

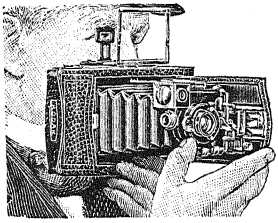
When Lenses are ordered from us fitted to this Shutter there is no extra charge for fitting. The charge for fitting customers' own lenses ranges from **17/6** to **30/-**

SINCLAIR LONDON

The Sinclair Frame Finder and View Meter

Saves Plates, Films and Disappointment

The unreliability of many camera finders has led to our designing new types of frame finders, which have many advantages over those previously placed upon the market.



THE SINCLAIR FRAME FINDER can be kept on or removed from the camera as desired.

THE SINCLAIR FRAME FINDER is collapsible and goes into a very small space.

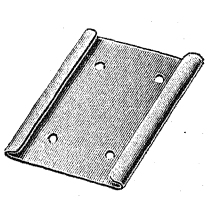
THE SINCLAIR FRAME FINDER can be accurately adjusted to show the picture taken by any camera with a large range of lenses.

THE SINCLAIR FRAME FINDER is equally suitable for the professional with a large stand camera, as for the amateur with a Vest Pocket Kodak.

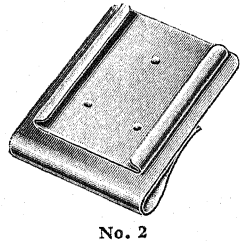
THE SINCLAIR FRAME FINDER permits of the camera being used at the eye level—the natural position.

THE SINCLAIR FRAME FINDER consists of a collapsible frame made of brass, attached to a base in the form of a lazy tongs that has at the other end a folding sighting plate. When closed, it measures 3″ × 1¾″ × ¼″ and weighs only 2 ozs.

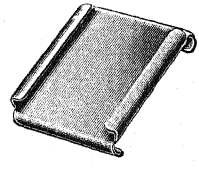
The finder is designed to slide into a variety of fittings that are made for all types of camera. When not in use, the folded finder can be kept on the camera or, if more convenient, carried in the waistcoat pocket.



No. 1



No. 2



No. 3

THE SINCLAIR FRAME FINDERS are made in two types and each type can be had with 3 kinds of fitting.

Type 1. For plates and films of the normal proportions, such as ¼-plate, 5 × 4 in., ½-plate, etc.

Type 2. For long narrow pictures such as given by the V.P.K., No. 1A, and 2C Kodaks, and postcard size.

The fittings are as follows:—

No. 1. Standard fitting, for cameras with wooden bodies to which the fitting can be screwed, and into which the Finder fits.

No. 2. Spring fitting, for attachment to metal cameras such as Folding Brownies, Carbines. Ensigns and V.P.K. Models B and III.

No. 3. Special fitting for use on the original Vest Pocket Kodak, no screwing being necessary.

Price :

Either type of Finder with one fitting of either number **6/-**
Extra fittings Nos. 1 and 3 .. each **9d.** Extra spring fittings No. 2 .. each **1/6**

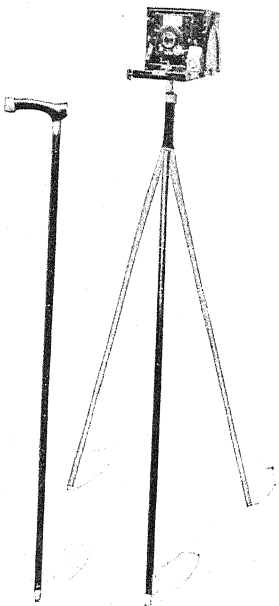
SINCLAIR LONDON

The Sinclair Walking Stick Stand

Walking stick stands have been designed from quite early photographic days, but the trouble with most of them is that they are not walking sticks if they are stands, and not stands if they are walking sticks.

THE SINCLAIR WALKING STICK STAND combines very successfully the functions of both walking stick and hand camera tripod.

From the illustration it will be seen that it is certainly a walking stick, and the view of the stick opened out as a stand is not likely to deceive anyone as to its value in this direction. It certainly is not meant for large or heavy cameras such as reflex instruments, but rather the small folding film pattern type, and it is quite satisfactory for use with our small "Una" Cameras. It will be seen that there is a ball and socket joint, and this will be found of considerable use when working on uneven surfaces.



The stand as a walking stick measures 36½ inches in length, and weighs 14½ ounces.

Price £1 15 0

The Sinclair Focussing Magnifier

for Reflex Cameras

The advantages of a Reflex Camera are greatly increased by the use of a pair of magnifying lenses fitted in the hood, for not only is a larger image seen in the ground glass screen, but all extraneous light is shut out.

The Sinclair Magnifier has been designed to close up inside the Focussing Hood and to spring into position directly this is opened for use.

It can be fitted to most types of Reflex.

Price with Spherical Lenses, including Fitting 27/6

Send power of Reading Glasses when ordering.

SINCLAIR LONDON

THE "N.S." UNIPOD



Invaluable for users of clockwork driven Ciné Cameras and greatly appreciated by hand-camera workers who wish to satisfactorily give the slower exposures.

It is impossible to do justice to this well designed Unipod in our illustration. In appearance it is like a walking-stick when closed, beautifully finished with black enamel and is 37½ inches long. It extends to 68 inches and is absolutely rigid. It is constructed of drawn steel tube and the inner section is nickel-plated with dull finish as a protection against rust. The black wooden knob is removed for use, and it can be supplied with ¼ inch Whitworth or Continental Screw Thread. When a camera is on this Unipod it can easily be held rigidly for exposures of ¼, ⅛ and $\frac{1}{16}$ second.

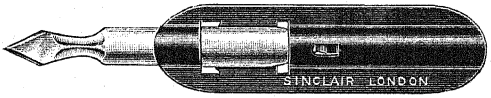
Weight 1½ lbs.

HERBERT G. PONTING, ESQ., F.R.G.S., writes: "I am delighted with the Unipod. It will be indispensable to me in the future."

Price 35/-

Leather Sling Handle for carrying Unipod on arm, **1/9** extra.

The Pen Print Trimmer and Retouching Lancet



This admirable little instrument should be kept in every photographer's pocket, or on the workroom table. For trimming prints, scraping out defects, or inserting a high light it is the best tool available, and being made of the finest steel, it can be sharpened to a keen edge.

Nickel Boxes containing 20 Lancets
Price, including Holder .. per box 1/6

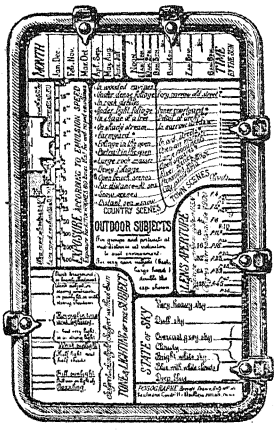
SINCLAIR LONDON

THE

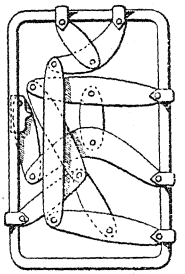
POSOGRAPH

is a Simple Automatic Calculator for Solving the Problem of Correct Exposures in Photography.

Silver Medal, Turin International Exhibition, 1923



OBVERSE FOR OUTDOOR SUBJECTS.



THE INTERIOR MECHANISM.

THE "POSOGRAPH" consists of a frame of polished nickel, along which slide six pointers against scales representing all the factors governing exposure; whether for exteriors or interiors. All these pointers are connected together with a most ingenious internal mechanism actuating a cursor bearing four points indicating the exposures required for any class of subject with plates of different speeds. The instrument measures 5¾in. by 3⅝in. by ¾in., and weighs 3½ ounces. It is supplied in a small flat pocket case.

ITS ADVANTAGE.—All that is necessary is to set the pointers to the appropriate positions, and then read the exposure time indicated by the point on the cursor corresponding to the speed of the emulsion used. The simplicity of this operation prevents those mistakes which so frequently arise when making an exposure, after the photographer has had to concentrate his attention to the adjustments of the camera.

Without previous experience the photographer is able, by its means, to Calculate the Exposure required to get a Perfect Negative, whatever may be the conditions either outdoors or indoors.

Invaluable for Autochromes and Colour Plates.

"We have at different times tested most of the exposure meters on the market, but we have not hitherto come across one so complete or ingenious as the 'Posograph.' A number of tests have been made with this instrument, and in each case the results, as checked from the negatives of the subjects photographed, have been within the recognised limits."—*English Mechanics.*

"..... besides dealing admirably with outdoor subjects, it provides a really bold endeavour to grapple with the difficulties of classifying indoor subjects."

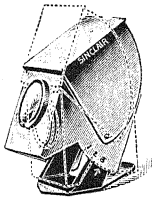
British Journal of Photography.

PRICE of the "POSOGRAPH" complete with pocket case 10/6

SINCLAIR LONDON

THE
Sinclair "Una" Finder

A REFLECTING FINDER FOR ACCURATE HAND CAMERA WORK



This unique finder is adapted for those hand and stand cameras of which the **Sinclair "UNA"** is the type. It is a square box finder fitted with a well-hooded ground glass arranged on a tilting base, and having a scale at the side to show the amount of rise on the camera front that is necessary in order to make the view on the plate or film agree with that given by the finder. The angle of view embraced is that given by the usual lenses fitted to cameras, such as 5″ on ¼-plate, 6″ on 5 × 4, etc. The finder is attached to the camera by means of a supporting bracket which is fixed to the base of the instrument with two screws. This bracket allows the finder to be folded inside the camera when the instrument is closed. When the camera is open, the finder is opened out at right angles to the base-board, and in the position that it occupies when in use.

When we ourselves fit this finder to a camera, we mark a scale on the side of the finder which is in agreement with a scale also marked on the rising front of the instrument. When holding the camera level, the finder is tilted to show the view desired on the plate or film, the position of the pointer on the scale at the side of the finder is noticed, and the rising front on the instrument is raised to agree with it.

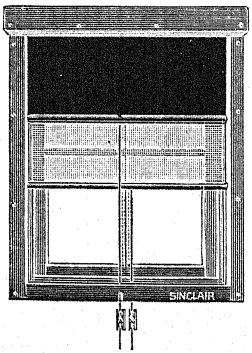
PRICE .. .. 10/6 each

Including fitting to Camera and scaling the finder and rising front **21/-**

When ordering say the size of the plate for which the finder is required.

The Sinclair Dark Room Blinds

AT ONCE CONVERT ANY ROOM INTO A DARK ROOM



"One of the things which we all at times make, or get made for ourselves, usually in a rather unsatisfactory way, has been done very well indeed by Mr. J. A. Sinclair's firm."—*British Journal of Photography.*

This consists of a well-made varnished wood frame with two grooves, in which red and black blinds travel, and when both are down no trace of white light is admitted. We make the fitting to any measurements, and we shall be pleased to give quotations on application. Screws are supplied with the blind, and all that is necessary is to screw it to the window frame.

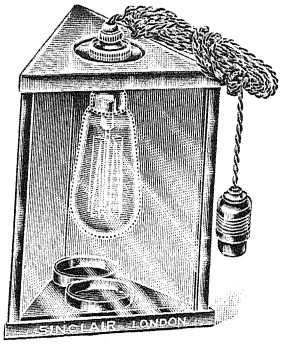
Specimen Size and Price:

Size about 5 ft. × 4 ft.	£9	0	0
„ „ 7 ft. × 4 ft.	10	0	0

Quotations given for any size.

SINCLAIR LONDON

The "Sinclair" Folding Copper Lamp

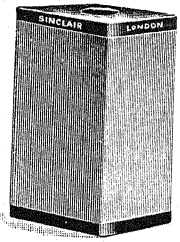


This Lamp is a thoroughly well made lamp, constructed of copper in such a way that it will take the usual safelights $8\frac{1}{2} \times 6\frac{1}{2}$ in., and is arranged with "bayonet" or "screw" adapter for attachment to electric light fittings. Where there is no electricity, the aperture which takes the electric light fitting is closed by means of a screw cap, and either "Sinclair Devolights" or Fairy Night-lights may be used for illumination. Folding flat and being non-rustable, it will be welcomed by travellers.

The price, complete with 6-ft. of flexible wire and lamp attachment, together with one $8\frac{1}{2} \times 6\frac{1}{2}$ in. Wratten Safelight of any grade, is 35/-
Extra adapter so that Lamp can be used with either "bayonet" or "screw" fitting 5/6
Extra Safelights .. .. each 5/6
Tropical "Devolights" for use with this Lamp, if electricity is not available .. .. .. per doz. 2/6
When ordering, state whether Lamp is required with "bayonet" or "screw" fitting.

The Sinclair "Tourist" Folding Lamp

(Made in Copper)



The Sinclair "TOURIST" Lamp, being made of copper, is non-rustable, and the upper and lower portions being pressed out of metal, have no joins at the corners, thus obviating stray light. The body of the lamp consists of two thicknesses of fabric, and this is sufficient for Orthochromatic, although not for Panchromatic plates.

Price, in box complete .. 4/-
Sinclair "Devolights" for use with these Lamps per doz. 2/6
The Sinclair "Devolights" give much more light than an ordinary night light, and being of hard wax, are suitable for the tropics.

SINCLAIR LONDON

The "Sinclair" High Power Focussing Magnifier. X.8.

Will be appreciated by those doing copying work or in subjects where very critical focussing is essential. Glasses with great magnifying power are usually so short that it is difficult to get the head sufficiently close to the ground glass focussing screen. In the case of the "Sinclair" Magnifier the tube is 5½ in. long, and the end which is placed into contact with the ground glass is sufficiently large to keep the glass steady when moving it over the surface. It reverses the image and consequently the picture on the screen is seen the right way up.



It is sold in a leather covered carrying case measuring 5¾ × 1¾ in., and the weight, complete with case, is 5 ozs.

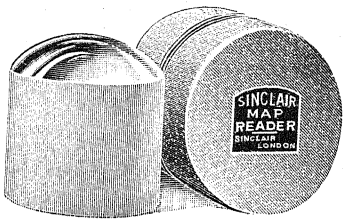
Price, in case complete **£2 2 0**

The "Sinclair" Map Reader

This Reader consists of a solid block of glass, which stands on the map, photograph, postage stamp or other article which it may be desired to examine. No special focussing is necessary, and motorists can examine details of their maps without stopping their cars. Curio collectors will appreciate the ease with which they can examine details of the signatures, etc.

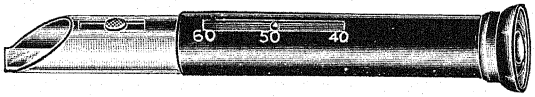
The Reader is sold in a leather covered case, measuring 1¾ × 1¾ in. (45 × 45 mm.), and the weight is 4½ ozs.

Price, in case complete .. **7/6**



Pen Microscope

These microscopes have the great advantage that they possess high power in a small space, and are wonderfully convenient to use. The No. 1 pattern is like a fountain pen in appearance and magnifies 25 times. The No. 2 pattern as illustrated is rather larger in size, and is fitted with achromatic lenses giving larger



field and magnification (40 to 60 times). The end of the microscope is placed on the surface to be magnified, and a sliding stud enables sharp focus to be secured. They are invaluable for examining signatures, botanical specimens and any fine detail.

No. 1. 25 times .. .. **5/6** each
No. 2. 40 to 60 times, in pocket-purse case .. **13/6** „
Screw focussing, **2/6** extra.
No. 3. 40 to 120 times, with stand .. .. **52/6** „

SINCLAIR LONDON

HOW TO MAKE A BROMOIL PRINT

Concise instructions for this interesting process

by JAMES A. SINCLAIR, F.R.P.S.

including catalogue of materials.

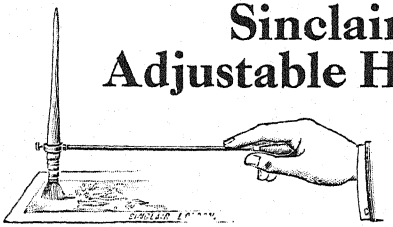
Post Free on application.

Sinclair Trial Outfits

containing the essential requisites for beginners, with Bromoil. Boxed complete. Price 10/6.

Postage in U.K. 9d. extra.

Sinclair Adjustable Hopper



A valuable adjunct for increasing contrast over small areas and for working clouds into the sky.

Price **2/6** each.

ACCESSORIES

Compressed Fibre Slabs—for pigmenting, 10×8 **2/-**; 12×10 **3/-**; 15×12 **4/6**

"Clairo"—a non-inflammable fluid for cleaning oil pigment brushes—per bottle, **1/6** and **2/6**

Pigmenting Palettes—plate glass, ground surface and edges. This is the best palette .. .. each **3/-**

Palette Knives .. .. ,, **2/-**

Blotting Boards—special thick, fluffless, 25×20, **5d.** per sheet; per doz. **4/-**

Retouching Lancets—for removing defects or scraping up lights in prints—(see page 513) .. .. per box **1/6**

Oil Stumps—for retouching and putting lights in wet prints per doz. No. 1 **5d.**

No. 2, Specially fine .. .. per doz. **6d.**

Spirit Sensitizer—for Oil prints, including Blanchard brush per bottle **1/9**

Flat Hog Hair Brushes—for use with Spirit Sensitizer .. .. each **3/-**

Tabloid Sensitizer—(B. W. & Co.) .. .. per carton **1/-**

Metal Clips—for hanging up prints to dry .. .. .. per doz. **2/3**

Varnish for Oil Prints .. .. per bottle **1/9** and **4/-**

Ditto, French .. .. per bottle **2/3**

Plastic Rubber—This may be moulded to any shape and is most useful for working on wet prints .. .. per piece **4d.**

SINCLAIR FINISHING RUBBER—For strengthening lights on any prints. Almost magical in its effect .. .. .. per piece **6d.**

SINCLAIR LONDON

Sinclair BROMOIL Brushes

Genuine Pole-cat Fitch Brushes.—These are undoubtedly the best brushes for Oil and Bromoil work and will last for years if carefully used.

No. 1, **1/6**	*No. 5, **2/6**	No. 12, **7/6** No. 20, **22/6**
No. 2, **1/7**	*No. 8, **4/6**	No. 14, **9/6** No. 24, **31/6**
*No. 3, **1/10**	*No. 10, **6/-**	No. 18, **16/-** No. 28, **50/-**

Small size for detail work A, **7d.**; B, **8d.**; C, **9d.**; D, **10d.** each

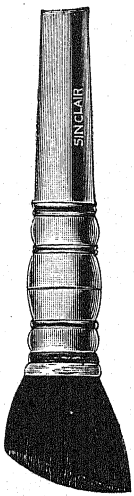
"B" Series Bromoil Brushes.—These brushes were introduced by us when pole-cat hair was practically unobtainable and are of excellent quality but have less resiliency.

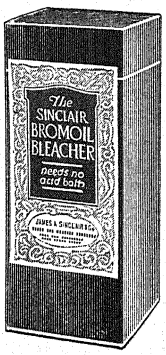
No. 0, **1/-**	*No. 5, **1/6**	No. 12, **3/-** No. 20, **7/-**
No. 1, **1/1**	*No. 8, **2/-**	No. 14, **3/6** No. 24, **9/-**
*No. 3, **1/3**	*No. 10, **2/6**	No. 18, **6/-** No. 28, **10/6**

*Nos. 3, 5, 8 and 10 are also supplied "straight cut" instead of bevel shape and are for use with a "Hopper."

"Mortimer" Brush.—This Brush is made of long and fine hog hair, shaped like our Fitch Brushes, and will be appreciated by those who desire broad effects. It is used by the Editor of the **Amateur Photographer.**

No. 1, ¾ in. .. **3/6**	No. 3, 1¼ in. .. **6/9**
No. 2, 1 in. .. **5/-**	No. 4, 1½ in. .. **7/6**





The Sinclair Bromoil Bleacher

Needs no Acid Bath and makes Pigmenting a pleasure.

The Sinclair Bleacher is made from our improved formula, which enables a Bromoil to be made from a more delicate print than is usual with work of the published receipts.

It is used by many leading experts.

10 oz. concentrated solution .. **2/-**

Post Free in U.K., **2/9**

PAPERS FOR THE BROMOIL PROCESS

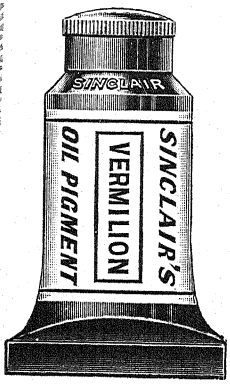
Double Weight: White, Smooth or Rough; and Cream, Smooth or Rough.

6½ × 4¾	8½ × 6½	10 × 8	12 × 10	15 × 12
7 pieces **1/3**	**3/-** per doz.	**4/2** per doz.	**6/4** per doz.	**9/6** per doz.

SINCLAIR LONDON

SINCLAIR'S IMPROVED BROMOIL PIGMENTS

ARE THE EASIEST TO USE.



Colours.

BLACK,	BURNT SIENNA,
BROWN,	ZINC WHITE,
BROWN BLACK,	VERIDIAN GREEN,
SEPIA,	FOLIAGE GREEN,
WARM SEPIA,	CADMIUM YELLOW,
BURNT UMBER,	LIGHT YELLOW,
COBALT BLUE,	RED CHALK,
ULTRAMARINE,	VERMILION,
INDIGO,	CRIMSON LAKE,

ENCRE MACHINE. A hard warm black ink.
ENCRE TAILLE DOUCE. A soft ink to mix with Encre Machine.

These two last are the inks used by Messrs. Demachy, Puyo, Read, etc.

All above colours **1/3** per tube.

Special Colours for Three Colour Work, **2/6** per Tube.

MEDIUMS for thinning the Colours.

The Roberson Medium—For quick drying **6d.** per Tube.

The Sinclair Bromoil Medium—A slow drying medium especially useful in the Transfer Process. **2/3** per large tube.

Sinclair 'Clairo'



A NON-FLAM CLEANING FLUID

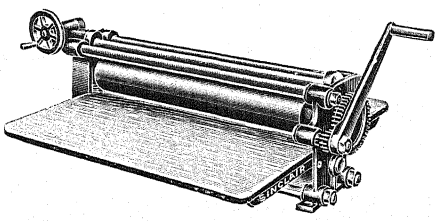
FOR CLEANING OIL PIGMENT, BRUSHES, AND THE BEST CLEANSER AND CLEANER FOR THE HOME.

Cleans without injuring Silks, Satins, Woollens, Linens Kid Gloves and Shoes Gramophone Records or Typewriters.

Bottles, 1/6 and 2/6 each.

SINCLAIR LONDON

Bromoil Transfer Press



The beauty of the transfer process appeals to everyone. By its means is obtained a peculiar quality very similar to that of photogravure. This Press is specially designed for the process, its features being:—

Perfect alignment of rollers, eliminating the need of a blanket, and ensuring a clear cut impression without creep.

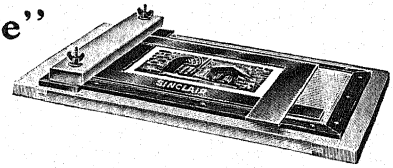
Simple and effective pressure loading device, giving the finest adjustments by the single motion of the hand wheel.

Ease and evenness of operation through the reduction gearing of ratio 3 to 1, giving easy turning with one hand.

Dimensions :—Roller Diameters 3⅛ inches. Effective Width of Rollers 20 inches. Table 23 × 23 inches. Approximate Weight 100 lbs.

Price, inclusive of Zinc Sheets .. **£11 15 0**

The "Revelle" Bromoil Transfer Desk



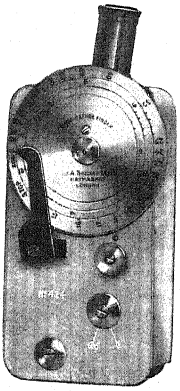
This desk was designed by Mr. A. Hamilton Revelle, a very clever and artistic worker, and it is particularly adapted for those who work in the smaller sizes, say up to 8½ in. by 6½ in., or who wish for further power of control when transferring.

It consists of a drawing board 16 in. by 11½ in. in which is framed a piece of plate glass. Two zinc squares are adjustable to hold the reversed Bromoil print, and these, as well as the transfer paper, are firmly held in position by a clamping board at one end of the desk.

The transfer is made by pressing a "tool" on the back of the transfer paper. With this desk re-inking is unnecessary. The progress of the print can be repeatedly examined, and continued action of the "tool" on the back of it will gradually increase the strength in that part. It is evident that this desk affords scope for much selective treatment in pictorial work. Price, **25/-**

Postage and packing in the U.K., **1/-** Transfer Tools, **3/-** each.

SINCLAIR LONDON



The SINCLAIR RANGE FINDER

IS THE PERFECT ONE MAN INSTRUMENT

Some advantages and uses of the Sinclair Range Finder

MILITARY

It can be used for taking **ranges and dimensions of any distant object with great exactness by one man.**
It registers the ratio of distance to base, and makes the base at the point observed.
It will measure **the distance of an object without the observer having to move in a lateral position.**
It may be used as a **Depression Range Finder, without the necessity for a pedestal or levelling.**
It can be used during attack, when, owing to enemy's fire, only a momentary observation is possible and will give the range **without** the necessity for **leaving cover.**

NAVAL

It may be used as a Range Finder from a fighting top.
It may be used from sea level when attacking permanent land fortifications.
It is the best instrument for Station Keeping and Coast Navigation.
It is unrivalled for rapid sextant work when it is advantageous to avoid the delay of consulting mathematical tables.

SURVEYING

It is the best instrument for Rapid and Accurate Survey Work, used in conjunction with a Plane Table.

The Sinclair Range Finder does not need a definite Base, Mathematical Tables or Difficult Calculation.

Weight in case complete, 2 lbs.

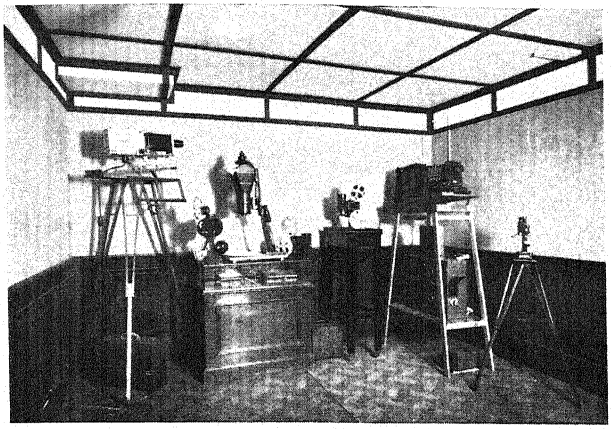
Price, including leather sling case **£7 10 0**

Send for Descriptive Booklet.

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WE SPECIALISE IN
Moving Picture Apparatus

Don't neglect making moving-picture records of your Home-Life or Holiday Scenes. They will be of the greatest interest in years to come.



Our Optical and Ciné Projection Room, 9-10 Charing Cross.

In our new Optical Projection Room we can show on the screen results obtained with the following apparatus, which we regularly stock.

For Sub-Standard Film.
- The Pathé Baby Ciné Cameras.
- The Kodak Ciné Cameras.
- The Bell-Howell Filmo Cameras.

Standard Size Film.
- The Bell-Howell Eyemo Camera.
- The De Vry Automatic Camera.
- The "N.S." Standard and Automatic Cameras.

Projectors of the best makes for all the above.

The "Sinclair" Legible Thermometer.

This thermometer will be found of great value when working with red and green safe lights, the scale being a very open one, and the figures of a large size.



The former has a range of from 40° to 120° F. and the scale is of opal contained in a glass tube and consequently unaffected by chemicals. The mercury tube has a magnifying lens front. The thermometer is sent out in a cardboard case and is 8½ ins. long. **Price 6/6**

SINCLAIR LONDON

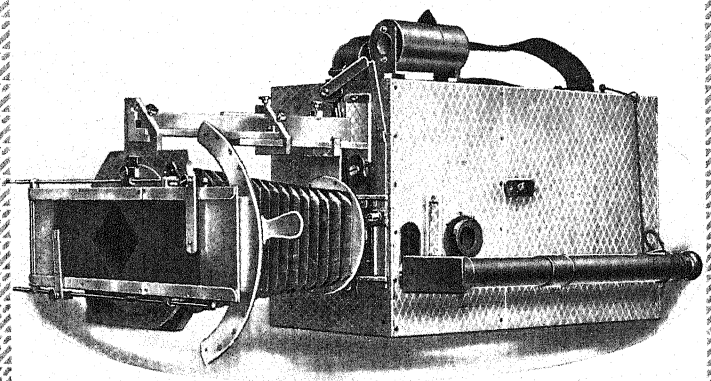
"N.S."

(NEWMAN & SINCLAIR'S PATENTS)

KINE' CAMERA

WITH

AUTOMATIC ELECTRIC DRIVE



Showing camera fitted with "N.S." Vignetting and Dissolving Apparatus

as supplied to the

ROYAL GEOGRAPHICAL SOCIETY

for the wonderful film

CLIMBING MOUNT EVEREST;

and amongst others to

MR. HERBERT G. PONTING, F.R.G.S.

THE METROPOLITAN MUSEUM OF ART, NEW YORK;

MAJOR RADCLIFFE DUGMORE

MR. CHERRY KEARTON

We have no hesitation in stating that our No. 3 "N.S." Kine' Camera is the most perfect instrument that has ever been made for the highest class Studio or Topical work, and is equally without peer for the Explorer or Scientist.

In general form the No. 3 Model is something like the Newman-Sinclair instruments which achieved so much success in the Great War, but the details of construction are such as to meet the demands of advanced modern studios where "effect" studies play a prominent part. The No. 3 "N.S." Kine' Camera greatly simplifies the production of the most elaborate effects, while its accuracy and reliability of construction makes it pre-eminent in this and every other sphere of moving picture photography.

SINCLAIR LONDON

THE "N.S." KINE' CAMERA—*continued.*



Copyright Mount Everest Committee.

Captain J. Noel, F.R.G.S., with the "N.S." Camera at 23,000 feet filming the climbing party at 25,500 feet.

SPECIFICATION.

Camera built entirely of metal, all parts being milled out of the solid, no castings being used. The metal is almost as light as aluminium, but is free from that metal's instability, and in its general characteristics and properties for standing shocks and strains resembles mild steel. Being light in colour, it reflects heat, and is therefore particularly adapted for tropical climates.

All works easily visible when the doors are opened, and every part accessible for cleaning.

Reversing action by merely turning the handle backwards. No bands to be shifted.

Square Film Boxes (holding 400 ft.) entirely without projections which automatically gear when placed in the camera. The absence of projections and the square form make them the most convenient for packing and transport. These boxes are provided with mouths which automatically open when closing the camera and they entirely obviate electrical markings or "static."

Automatic Shutter "fade out" and "fade in," by merely pressing a lever when the camera is running. It works equally well when running forward or backward and the normal "fades" take place in 5ft. or 10ft. of film, at the will of the operator. The "fade" can be arrested in any position, either in opening or closing. Shutter alterable to any size at will, from the outside of the camera.

Film Counter. This is at the back of the camera, and shows very plainly the amount of film in the camera, and the length to a single picture determined at any moment. Each individual picture is recorded, and can be returned to after exposing any length of film.

Focussing can be accomplished by three methods in this apparatus. Firstly, from a reflex focussing arrangement which carries a magnifying eye-piece on the side of the camera. Secondly, by an accurate scale focussing seen from the back of the camera. Thirdly, by a prism eye-piece for magnifying the image seen through the film itself.

SINCLAIR LONDON

THE "N.S." KINE' CAMERA—*continued.*

SPECIFICATION—*continued.*

Iris worked from the back of the camera, by the movement of a lever, accurately scaled. The same scale may be adjusted to automatically work with both 2" and 3" lenses, without alteration.

Masks of any design can be inserted or removed without opening the camera and film is consequently saved.

Lenses interchangeable on interchangeable fittings, which can be attached or detached with one hand only.

Single picture handle always in position.

Brilliant Finder. Each camera is supplied with a brilliant finder, which is quickly attached or removed from the top of the camera, and this finder is without parallax. Masks are supplied to fit the finder, so that the correct image can be seen with lenses of any focus.

The "N.S." Automatic Electric Drive. Owing to the extraordinary ease with which the "N.S." Kine' Camera runs, we are able to drive it with a small motor that only weighs 2¾ lbs., the power being provided by a battery which, with its containing box, weighs 9½ lbs., and which will drive 4,000 ft. without recharging. For Studio use larger size batteries may be had. For those who require it, we also provide a Relay Instrument complete in box, by means of which the camera can be started and stopped at any distance up to 100 yards, and longer distance relays can be made to order. Full particulars will be found in our Kine' Camera Catalogue.

The "N.S." Vignetting and Dissolving Apparatus. This apparatus is carried on the front by means of an extension arm, detachable in an instant. It consists of bellows fitting carrying at the front our Improved "N.S." Iris Attachment and Adjustable Card Carrier. This iris can be set to vignette any portion of the picture, and is so constructed that it gradually and **entirely** closes and it can also be set to open or close to any definite point desired. The front card holder enables a roller blind or curtain effect to be produced, or by cutting cards to any desired shape, parts may be vignetted off. A second attachment forms a most complete vignetting device, which enables squares, rectangles, ovals or blind effects to be produced at any part of the picture and the action is controlled exactly and with great sweetness by a simple lever movement. The metal portions of these attachments are constructed of the same metal as the body of our cameras; they close up into a very small space when not in use, and only weigh 3 lbs.

Concerning the tour of H.R.H. The Prince of Wales in S. Africa and S. America, H. Bruce Wolfe, Esq., of the British Instructional Films, sent the following extract from a report by Mr. Barkas, their chief Operator:

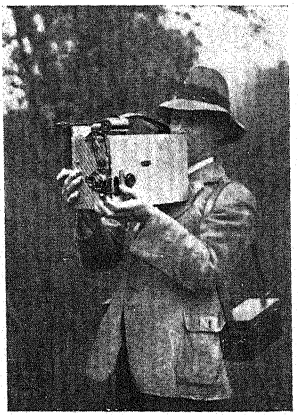
"I find that it is very handy, light in "weight, simple in operation and exceeding- "ly quick off the mark. It is silent. "As a machine for this type of work, or "for work in the Tropics or in severe "cold, I would recommend the New- "man-Sinclair."

Mr. Harry Burton, of the Metropolitan Museum of Art, New York, writes:—

"The Camera acted splendidly as always."

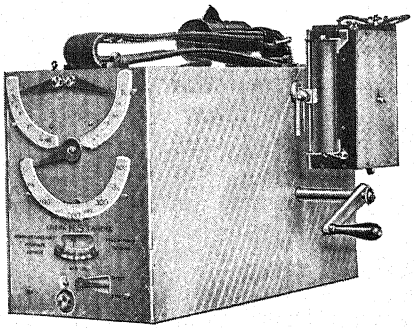
Captain J. Noel, F.R.G.S., the official photographer to the Mount Everest Expedition, writes:—

"At all times the camera behaved perfectly, and during all my climbs I found the apparatus never a burden but always a pleasure to operate. I could not have got my pictures unless my camera had been so portable and efficient."



Major A. Radclyffe Dugmore with the "N.S." Kine' Camera with Automatic Electric Drive.

SINCLAIR LONDON



The " N.S." Kine' Camera with *Automatic Electric Drive*, the back of the Camera shows Counter, Iris and Focussing Levers, Fade Away Lever and Film Marker.

The " N.S." Camera is the easiest camera to thread, using a minimum quantity of film and can be threaded as easily backwards as forwards. **It is the lightest running camera ever made.**

Size of Camera with 2 film boxes, 14 × 5¾ × 8 inches (355 × 146 × 204 mm.).

Weight 18 lbs. 5 ozs. (8.3 Kilos).

Net Cash Prices in London.

	Price £ s. d.	Code Word
FOR TOPICAL USE		
No. 3 "N.S." Kine' Camera, as described for Studio use, but without the iris and dissolving attachment for front of camera	**200 0 0**	SPADROON
Ditto, with electric automatic drive and battery ..	**225 0 0**	SPAGAT
FOR STUDIO USE		
No. 3 "N.S." Kine' Camera, as described, with either 1½ in. or 2 in. F/3.5 Ross "Xpres" Lens, complete with 2 film boxes, "N.S." brilliant finder, reflex focussing finder with periscopic tube attachment, fade out to shutter, front adjustable iris with fitting for blind effects and attachment for every kind of studio dissolving effect, to bring diamond, square, rectangular, or oval cut-off to any part of the picture	**225 0 0**	SPADATTI
Ditto, with electric automatic drive and battery ..	**250 0 0**	SPAETROSE
EXTRAS AND SPARES		
Relay Instrument complete in box, for driving camera at any distance up to 100 yards	**20 0 0**	SPAIANDO
Light-tight film boxes, each holding 400 ft. .. each	**4 10 0**	SPAHEES
Extra Batteries for use with automatic drive, each sufficient for 4000 ft. of film without re-charging, each	**4 10 0**	SPAIASSE
Batteries for studio use when using automatic drive For 10,000 feet before re-charging .. each	**5 5 0**	SPALAVA
Set of 12 Masks in case	**4 10 0**	SPADICOSE
Best hand-sewn solid leather case to hold No. 3 Kine' Camera and finders	**6 16 0**	SPADDLE

FOR EXTRA LENSES SEE OUR "N.S." KINE' COMPLETE CATALOGUE. Post Free on application.

SINCLAIR LONDON

THE "N.S."

Auto Kine' Camera

(NEWMAN & SINCLAIR PAT. APPLD. FOR)

is the most marvellous clockwork driven camera in the world.



Holds 200 feet standard film all driven with two windings.

Since its introduction a year ago this wonderful camera has been still further improved. With film in good condition it will drive 150 feet to 180 feet with one wind of the clock and only two winds are required for the whole 200 feet that it contains.

ITS APPEARANCE. The "N.S" Auto Kine' Camera is made entirely of metal. Duralumin being used. The box-like shape makes it a very convenient instrument to handle and carry.

THE FILM BOX. This box is made of Duralumin. It is rectangular in form without projecting mechanism. It holds 200 feet of film, and into the same box the film is automatically wound after exposure. When the film is used, the box can be removed from the camera in daylight and another box of film inserted in its place in from 10 to 15 seconds.

THE FINDER. The Finder is viewed right through the instrument, and it shows the image the right way up and the right way round. At the bottom of the Finder is a transparent scale, and as the film is used the number of feet exposed is read off at the same time that the subject being photographed is seen. A level inside the Finder shows the bubble in the centre of the picture while the exposure is being made.

LENSES. The Lens normally fitted is a 2 in. F/3.5 Ross "Xpres," and extra lenses can be supplied up to 6 in. in focus, mounted in the same special focussing mounts. These mounts can be expeditiously removed from the camera, and are perfectly light-tight.

THE MECHANISM. The camera is driven by two springs, both of which are wound to the full at starting, but either spring can be wound at any time even when the camera is in action or running. **Absolutely silent ratches are employed,** so that no attention is drawn to the camera whilst winding. The regulation is so exact that it varies less than 2% from the start to the finish of the run. The clockwork is arranged for the regular film speed—16 pictures per second—but an adjustment permits of considerable variation when it is necessary to take either more or less pictures in a given time.

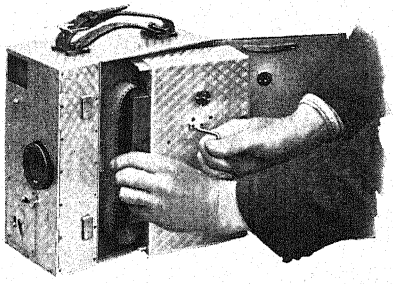
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THE "N.S." AUTO KINE' CAMERA—

Continued.

The camera is provided with the usual punch to record the end of a picture, and this is situated at the front of the instrument.

The construction of the "N.S." Auto Kine' Camera, as with our Standard Model, practically eliminates static. Every detail has been studied, and this instrument is an outstanding triumph in kinematograph construction.



The Camera is loaded in a few seconds. There is no threading up.

Size 9½ × 4¾ × 9½ ins. (24 × 12 × 24 cm.)
Weight 17 lbs. (7.8 kilos).

NET CASH PRICES IN LONDON OF THE "N.S." AUTO KINE' CAMERA.

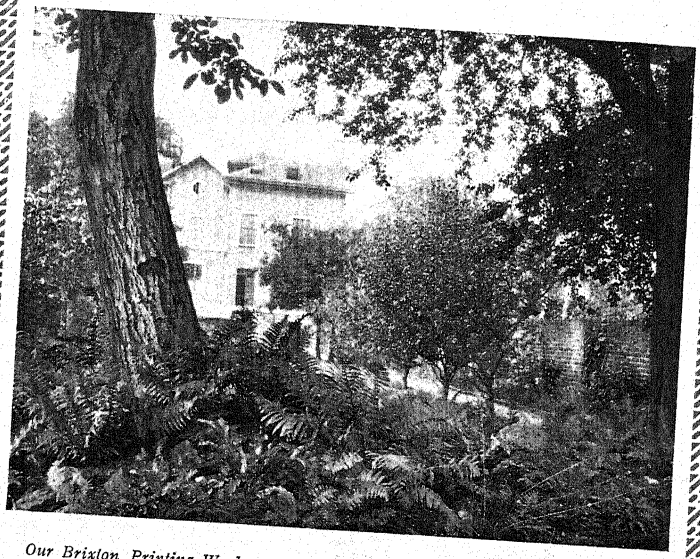
	Price	Code Word
"N.S." Auto Kine' Camera with 2" F.3.5 Ross "Xpres" Lens, complete with film box as described	£120 0 0	SPEEDED
Ditto, with 2" F.2 Cooke Lens ..	127 10 0	SPEECH
Best Hand Sewn Solid Leather Case with lock and key and sling strap	4 15 0	SPEEDING
Extra Film Boxes for 200-ft. 35 mm. film .. each	8 10 0	SPEEDWELL
Best Hand Sewn Solid Leather Case for two extra film boxes	4 0 0	SPEELBOUT
Best Hand Sewn Solid Leather Case for two extra film boxes and extra lenses	4 10 0	SPEELGOED
The "N.S" Unipod (see page 513)	1 15 0	STABILITY

For full details and prices for Extra Lenses see Special List. Post Free on application.

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SEND YOUR FILMS TO US
for Developing, Printing or Enlarging

At our Brixton Works, which are in ideal surroundings, we specialise in the best work. From our prices it will be seen that it probably costs less to place your orders in the hands of experts than to give them to a jobbing store that makes a D. & P. department simply a side line of another business.



Our Brixton Printing Works

	V.P. Kodak No. 1 Brownie No. 1 Ensignette	No. 2 Brownie $3\frac{1}{2} \times 2\frac{1}{2}$	No. 2 Bull's Eye, No. 1A Kodak	No. 3 Kodak & $4\frac{1}{4} \times 3\frac{1}{4}$	Postcard and 5×4	10×15 cm.	$\frac{1}{2}$-plate and 7×5
Developing Roll Film	-/6 per roll	-/6 per roll	1/6 per doz.	2/- per doz.	3/- per doz.	3/6 per doz.	4/- per doz.
Black and White Prints on Gaslight paper, per doz.	2/-	2/-	2/6	3/-	3/6	4/-	4/6

Post Free for Cash with order.

Every kind of Printing and Enlarging is undertaken as well as Finishing and Framing, and we shall be pleased to quote for any requirement. Send for complete list of this work. Post Free.

Lantern Slides a speciality. Warm or Black Tones, **20/-** a dozen.

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LTD.

Specialists in New and Second-hand Photographic and Optical Apparatus.

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Post Free On Application.

— SOME SELECTED BARGAINS. —

¼-plate Dallmeyer Reflex, Dallmeyer Press F3.5 anastigmat lens, iris, Dallmeyer Series XVIII, Dallon Telephoto F6.5 anastigmat, interchangeable with the Press rack and pinion focussing, self-capping focal plane shutter, speeded to 1/1000th, with all outside adjustments, revolving back, 6 slides, film pack adapter and leather case, condition equal to new. Cost £35 ... ... **£22 10 0**

3½ x 2½ Bentzin Folding Reflex, Carl Zeiss Tessar F4.5 anastigmat lens, in sunk mount, iris diaphragm, rack rising front, deep focussing hood, self-capping focal plane shutter speeded to 1/1000th, outside adjustments, revolving back, focussing screen, 5 double dark slides, film pack adapter and leather case. Condition equal to new. Cost £37 10s. **£25 17 6**

¼-plate Self-Capping Goerz Anschutz, Collapsible focal plane, Carl Zeiss Tessar F4.5 anastigmat lens, iris, focussing, rising and cross front, direct vision finder, self-capping focal plane shutter speeded from 5 secs. to 1/1000th, outside adjustments, 4 double dark slides, Mackenzie Wishart slide and leather case. £40 ... ... **£18 18 0**

3½ x 2½ Adams Focal Plane Vesta, Carl Zeiss Tessar F4.5 anastigmat lens, iris, focussing, rising front, identoscope finder, Adams lens hood, self-capping focal plane shutter speeded to 1/1000th, outside adjustment, colour filters, daylight loading film pack adapter, in leather case. Cost £25 ... ... **£12 17 6**

¼-plate Newman and Guardia New Ideal Roll Film Sybil, Cooke Series II F4.5 anastigmat, N. and G. high precision shutter speeded from ¼-sec. to 1/100th, time and bulb, rising and cross front, N. and G. reversible reflex finder with two-way spirit level showing the exact amount of rise and fall on front, Radial focussing adjustment with depth of focus index, leather bellows and covering, complete in pig-skin case, in new condition. Cost £30 ... ... **£22 10 0**

3¼ x 2½ Contessa Cooarette Roll Film and Plate, Carl Zeiss Tessar F4.5 anastigmat lens, compur sector, fully speeded shutter from one sec. to 1/200th time and bulb, full double extension by rack and pinion focussing adjustment, engraved scale of distances, U-form front with rack to rise, reversible finder and spirit level, iconometer finder, leather bellows and covering, plate attachment, screen and 3 single metal slides, in new condition **£9 9 0**

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'Phone: Clerkenwell 0691 and 0592.

Telegrams: Retoucher, Barb., London.

Selected Bargains in Second-hand Apparatus.

Bell-Howell Filmo 16 mm. Automatic Cinematograph Camera, fitted F3.5 Taylor-Hobson Cooke anastigmat lens, in special focussing mount, together with leather carrying case, with specially fitted combination lock. Cost £62 10s. Practically new condition **£46 10 0**

¼-plate N.S. Sinclair Reflex de Luxe, F4.5 Zeiss Tessar anastigmat lens, also 12-in. F5.6 Dallmeyer Dallon Telephoto anastigmat, interchangeable, Sinclair's patent between-lens shutter ½ to 1/1000th sec., time, rising and falling front, revolving back, deep triple reversible and detachable focussing hood, full size top screen, silver-surfaced mirror, set of Wratten colour filters, 6 double dark slides, with adjustable cut film sheaths, leather carrying case, practically new condition. Cost £65 ... ... **£38 10 0**

Kodak Co. Model C. Kodascope Projector, complete with motor, flex and resistance for use on house supply and metal cover as carrying case. Cost £18. As new **£11 17 6**

3¼ x 2½ Dallmeyer Pentac Daylight Loading Roll Film, F2.9 Pentac anastigmat lens, Compur sector shutter, radial focussing, complete in leather case Unsoiled **£13 13 0**

15 x 12 Tropical Model Sanderson Field, 32¼-in. Zeiss Patent anastigmat working at F8, rising, cross, and swing front, every possible movement, swing and reversing back, rotating turntable, roller blind shutter, 1 double dark slide, leather case. Cost £75 ... ... **£48 10 0**

Model A Kodascope Cine Projector, 16 mm. film, capacity 400 ft., 2-in. lens, rewinding mechanism, film splicing outfit, 50-volt 200-watt lamp, complete with supplementary resistance up to 250 volts. List price £58 7s. 6d. Practically new **£45 0 0**

Model B. Cine Kodak Cine Camera, F3.5 anastigmat lens, capacity 100 ft., complete in leather case. List price £26 12s. 6d. Practically new **£18 8 0**

3¼ x 2½ Tropical Model 6 W.P. Carbine for Roll-films and Plates, F4.5 Aldis anastigmat, Compur shutter, plate back, 1 slide, leather case. As new **£8 15 0**

10 x 15 cm. Zeiss Palmos Focal Plane, F.P. shutter, 1 to 1/100th and time, F4.5 Zeiss Tessar and anastigmat lens, 3 slides, F.P. adapter **£19 10 0**

Latest Pattern Victor 16-mm. Cine Camera, F3.5 Dallmeyer anastigmat lens. First-class order **£35 0 0**

4½ x 6 cm. Vest Pocket Tropical Model Sonnet, Carl Zeiss Tessar lens, F4.5, Compur shutter, 6 slides, F.P. adapter. First-class condition **£7 10 0**

3½ x 2½ All-Metal Zeiss Minimum Palmos Collapsible Focal Plane, shutter speeded to 1/1000th sec., Carl Zeiss Tessar lens, F4.5, 3 metal-bound D.D. slides, F.P. adapter, leather case **£15 0 0**

3½ x 2½ Latest T.-P. De Luxe Reflex, all up-to-date movement, revolving back, self-capping focal plane shutter, speeded to 1/1000th sec., Aldis anastigmat lens, F4.5, 3 double book-form slides, F.P. adapter, leather case. Unsoiled. Cost recently over £30 ... ... **£19 10 0**

3½ x 2½ T.-P. Junior Special Ruby Reflex, F3.9 Taylor-Hobson Cooke anastigmat lens, 3 slides, F.P. adapter **£8 17 6**

¼-plate Ensign Folding Reflex, F4.5 Ross Xpress anastigmat, self-capping shutter, revolving back, 3 D.D. slides, F.P. adapter, leather case. Perfect condition **£13 17 6**

THE CITY SALE & EXCHANGE, LTD.

90-94, FLEET STREET, LONDON, E.C.4

'Phone: 6981 City. Telegrams: Films, Fleet, London.

Exchange your apparatus for one of these Special Offers.

¼-plate N. and G. Trellis Universal Folding Hand and Stand, all movements, Zeiss convertible Protar lens, Compur shutter, 3 d.d. slides, leather case. Cost £40 ... ... £11 15 0

¼-plate Ensign de Luxe Reflex, long extension, rack focus, revolving back, self-capping focal plane shutter, speeded to 1/1000th, Ross F3.9 anastigmat lens, 3 d.d. slides, film pack adapter, leather case. £10 10 0

¼-plate Tropical Model Adam's Minex de Luxe Reflex, all teak and brass bound, revolving back, masking device, Ross Xpres lens, F4.5, 3 teak double slides, film pack adapter, colour screens, brown carrying case. Cost £108 ... ... £67 10 0

3¼ x 2½ Dallmeyer Speed, F2.9 Pentac lens, focal plane shutter, speeded to 1/800th, 3 d.d. slides, F.P.A. leather case £25 0 0

3¼ x 2½ N. and G. Folding Reflex, revolving back, focal plane shutter, speeded to 1/800th, Ross Xpres lens, F4.5, 3 metal bookform slides, F.P.A., brown cowhide carrying case, new condition £30 0 0

3¼ x 2½ All-metal Zeiss Minimum Palmos, collapsible focal plane, Zeiss F4.5 Tessar lens, focal plane shutter, speeded to 1/1000th, 3 d.d. slides, F.P.A., leather case. First-class order £13 17 6

¼-plate N. and G. Square Reflex, long extension, rack focus, revolving back, right and left-hand release, Ross Xpres lens, F4.5, 6 d.d. slides, F.P.A., changing box, leather case. Cost over £60 New condition ... £25 0 0

¼-plate All-metal Goerz Tenax Pocket, double extension, rack focus, Goerz Dogmar lens, F4.5, Compur shutter, 6 slides, F.P.A., brown leather carrying case £8 8 0

¼-plate Regular Sanderson Hand and Stand, latest pattern, wide angle rack, etc., Zeiss convertible Protar lens, F6.3, Compur shutter, 3 d.d. slides, F.P.A., leather case. Cost £27 ... ... £10 0 0

P.C. 3A Kodak Roll Film Reflex, double extension, F4.5 Zeiss Tessar lens, focal plane shutter, speeded to 1/1000th and time, leather case. Cost £36 ... ... £11 11 0

5 x 4 Goerz Folding Reflex, reversing back, self-capping focal plane shutter, speeded to 1/1000th, Goerz Celor lens, F4.8, 3 d.d. slides, F.P.A., leather case. Cost £36 ... ... £8 5 0

¼-plate T.-P. Reflex, long extension, reversing back, self-capping shutter, speeded to 1/1000th, Aldis anastigmat lens, F4.5, 6 slides, F.P.A., nice order £7 10 0

3¼ x 2½ Ernemann Folding Reflex, revolving back, focal plane shutter, speeded to 1/1000th, Zeiss Tessar lens, F4.5, 3 d.d slides, F.P.A., automatic magazine changing box, as new £32 10 0

Bell Howell Filmo Cine. Camera, with F3.5 Dallmeyer anastigmat, leather carrying case. Cost £58 ... ... £39 10 0

Cine. Kodak, latest model, F3.5 anastigmat, leather case. Cost £26 12s. 6d. New condition £18 0 0

P.C. N. and G. Sibyi, Pocket, F4.5 Carl Zeiss lens, high precision shutter, 6 slides, F.P.A., leather case. Cost £40 ... ... £12 0 0

P.C. and 5 x 4 latest T.P. All-weather collapsible focal plane, self-capping focal plane shutter, speeded to 1/1000th, F4.5 Carl Zeiss Tessar lens, 6 double slides, F.P.A., as new £19 10 0

P.C. Latest Ross Panros collapsible focal plane, latest F4.5 Ross Xpres lens, 4 double slides, F.P.A., leather case. Cost £38, as new £24 0 0

THE CITY SALE & EXCHANGE, LTD.

54, LIME STREET, LONDON, E.C.3

'Phone: 0180 Monument. Telegrams: Phototypic Led. London.

Easy Payments Arranged to suit your convenience for any of these Special Offers.

½ Goerz Tenax F4.5, Goerz Dogmar Anastigmat, Compur shutter, 1 sec. to 1/200th, rising and cross front, double extension, rack focus, leather bellows and covering, screen, 6 slides, leather case, as new £11 5 0

3½ x 2½ N. G. Roll Film Sybil, F4.5 Ross Expres anastigmat, N. and G. shutter, ½—1/150th, Radial focussing, rising and cross front, patent reflex finder, leather bellows and covering, complete with pig-skin case £19 10 0

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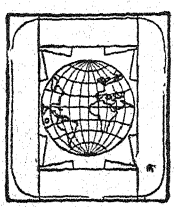
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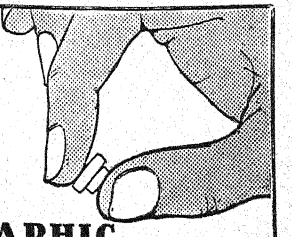
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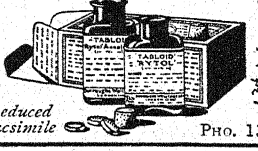
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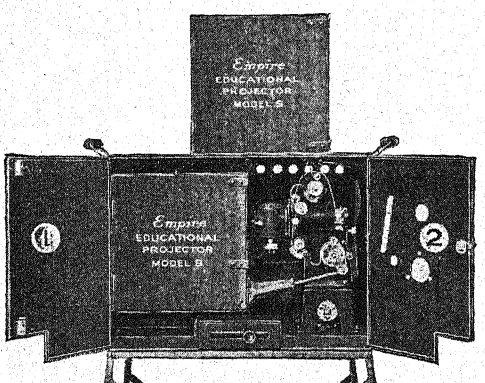
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15	5½	4¼ × 3¼	2	1A	5 10 0	6 15 0	—
16	5¾	4¼ × 3¼	2	1A	5 15 0	7 5 0	6 15 0
16A	6	5 × 4	2	2	7 0 0	8 5 0	—
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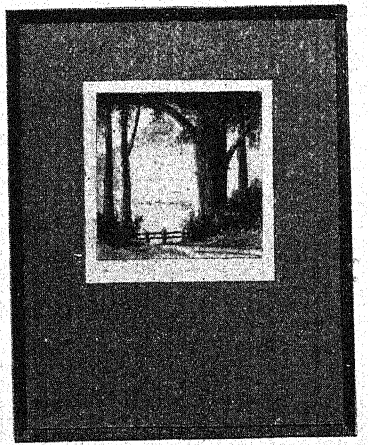
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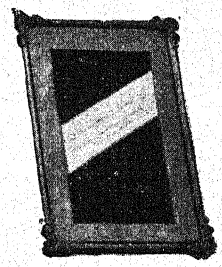
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3/133.	**—¼-Plate Ansco Roll Film Camera;** R. R. Lens; Ansco Shutter 1/5th to 1/100th, T. & B.; Focussing Screen; 1 D.D. Slide; Cowhide Case ... ... For	5	0	0
3/139.	**—Home Cinematograph "Monopol" Projector** (Standard size, 35 m/m.); Arc Lamp; Motor; Lens; Resistance; Regulator; 14 Drums; one Dividable Drum; adapted for any electric plug to 250 volt ... ... For	35	0	0
3/146.	**—One Kodak Model A Camera;** 16 m/m.; Anastigmat F/3.5; Finders; Ash Tripod ... ... For	20	0	0

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3/150.	**¼-Plate Autographic Kodak;** Kodak Anastigmat F/7.7; Kodak Shutter 1/25th to 1/100th, T. & B.; Finder; Cowhide Case ... For	4	15	0
3/152.	**—Bell & Howell "Filmo" Projector;** 2 in. Lens; 200 Watt Lamp; Motor; 400 ft. Reel and Can; Resistance to 250 Volts; Leather Covered Case ... ... For	50	0	0
3/162.	**—100 ft. Standard Cinema Camera;** Rudersdor Kino F/3.5; Finder; Telescopic Tripod ... ... For	15	0	0
2/193.	**Ica Cinematograph Kinamo Camera;** Tessar F/3.5; Daylight loading capacity 50 ft. standard Film; six daylight loading Film Boxes; Direct Finder; Cowhide Case ... ... For	15	0	0
5/210.	**—3½×2½ Folding Mentor Reflex;** Tessar F/4.5; Shutter from 1/14th to 1/1200th; Screen; 3 D.D. Slides; F.P. Adapter ... For	15	0	0
6/210.	**—¼-Plate "Soho" Reflex Camera;** "Celor" F/4.8; Shutter from 1/16th to 1/800th; 9 D.D. Slides; F.P. Adapter; Cowhide Case. For	16	0	0
7/224.	**—¼-Plate Folding Premier Reflex Camera;** Tessar F/4.5; Shutter giving 1/15th to 1/1000th; Screen; 6 D.D. Slides; F.P. Adapter; Lens Cap; Revolving Back ... ... For	20	0	0
7/228.	**—¼-Plate Adams Folding "Minex" Reflex;** Ross Xpres F/4.5; Verito 7½ in. Diffused Focus F/4; Shutter ⅛th to 1/1000th, T. & B.; Revolving Back; Spirit Level; Focussing Magnifiers; 3 D.D. Slides; F.P. Adapter; 4-way Swing Front; Case ... ... For	55	0	0
7/234.	**—5×4 "Soho" Reflex;** Tessar F/4.5; 6 D.D. Slides; Revolving Back; Kershaw F.P. Shutter 1/14th to 1/800th; Cowhide Case ... For	30	0	0
7/242.	**—¼-Plate Adams Tropical "Minex" Model A Reflex;** Tessar F/4.5; Shutter ⅛th to 1/1000th, T. & B.; 7 Block Slides; Bis-Telar F/7.7 Telephoto Lens; Stand; 2 Leather Cases and many accessories. For	68	0	0
2/274.	**—5×4 Minimum Palmos;** Tessar F/4.5; Focal Plane Shutter from 1/10th to 1/1000th; 3 D.D. Slides; F.P. Adapter; Cowhide Case ... ... For	20	0	0
4/326.	**—1/1 Sanderson Field Camera;** Dallmeyer 3D Portrait Lens F/6 adapted for Soft Focus Effects; 12½ in. focus; F/10 Dallmeyer Rapid Landscape Lens, 15 in. focus; 2 spare Lens Panels; Focussing Screen; 3 D.D. Slides; Ash Tripod; Canvas Case ... ... For	17	10	0
3/345.	**—7½×5 "Acme" Field Camera;** Aluminium Fittings; Dallmeyer Single Landscape Lens No. 2 of 8½ in. focus; Reversing Back; Screen; 6D .D. Slides; 4 Carriers for ¼ plates; 3-fold Tripod; Cowhide case. For	10	0	0
3/349.	**—¼-Plate Field Camera;** R.R. F/8; 2 D.D. Slides; Focussing Screen ... ... For	4	0	0
2/353.	**—Model 3a "Verascope";** 2 Tessar Lenses F/8; changing box for 12 plates; Leather Case ... ... For	8	0	0
367.	**—Post Card or 10×15 c/m. Goerz Anschutz Stereoscopic Camera;** Goerz "Dagor" Lenses F/6.8; Focussing Screen; Direct Finder; 4 D.D. Slides; F.P. Adapter; Cowhide Case ... ... For	20	0	0
4/378.	**—Set C. Zeiss Protar Lenses for 6½ in. × 4¾ in. or 7½ in. × 5 in.;** Series VII. consisting of Nos. 2, 3 and two of No. 4 ranging from 5¾ in. combined Focus to 14 in. with single components; standard mount with Iris; scaled diaphragm ring for any combinations; Leather Case ... ... For	12	0	0
4/379.	**—Ross Telecentric Telephoto Lens F/5.4;** Lens Cap; Leather Case ... ... For	8	10	0
4/381.	**—Zeiss Magnar Telephoto Lens F/10;** Lens Cap; Flange; Leather Case ... ... For	7	10	0
3/399.	**—Pair Cinematograph Projection Lenses;** 1⅞ in. diam., 4 in. focus, by Purser, London ... ... For, per pair	4	0	0
3/438.	**—15×12 T. T. & H. Lens, F/8 Rapid Rectilinear;** Iris Diaphragm and Cap; no Flange ... ... For	5	0	0
3/493.	**—Dallmeyer Dallon Telephoto Lens,** F/6.5; Lens Hood and Cap; no Flange ... ... For	5	0	0
3/628.	**—Set of 5 Wratten Tricolour 2 in. square Filters,** Orange, Red, Blue, Light Green and Dark Green; Filter Holder to fit Lens Hood 1½ in. to 1¾ in. diameter ... ... For	0	15	0
2/787.	**—Zeiss "Ducar" Filter, IV/15,** suitable for Zeiss Tessar F/4.5 Lens of 6 in. focus, complete with cap ... ... For	0	12	6

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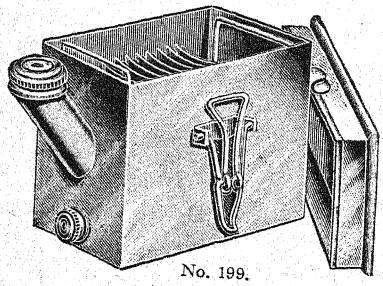
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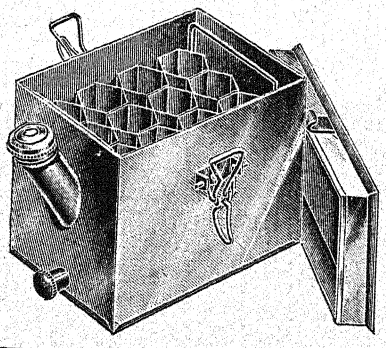
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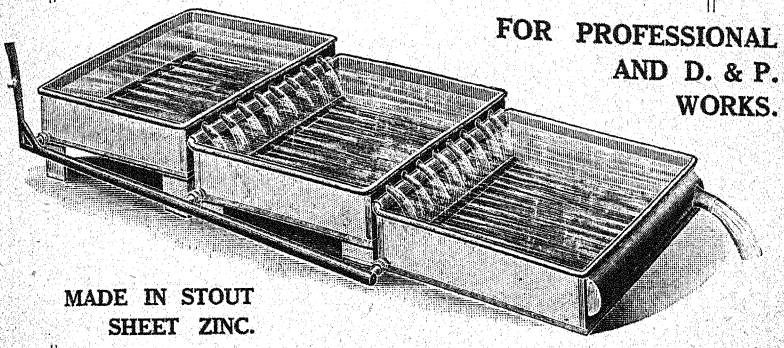
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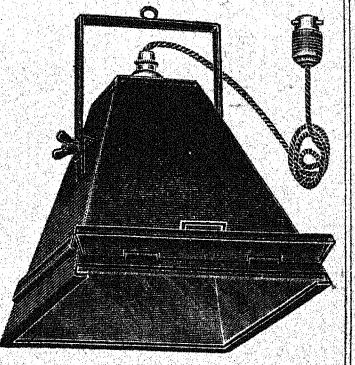
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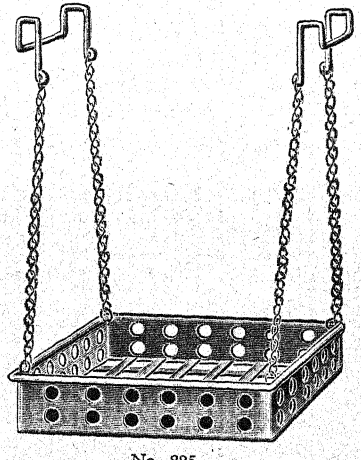
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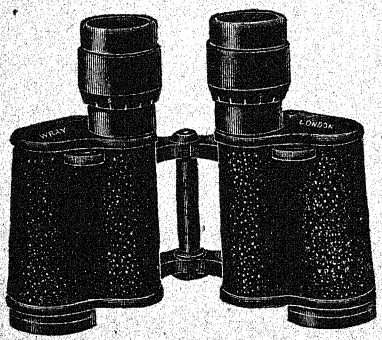
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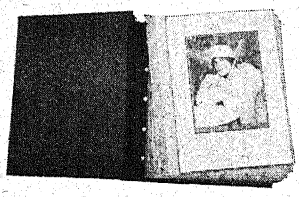
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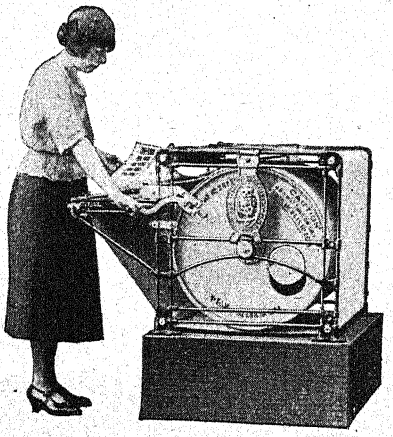
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Ins.	m/m	Ins.	c/m	Std. Mnt.	Sunk Mnt.	£ s. d.	£ s. d.
1⅜	35	Kine	Kine	1¼	—	13 0 0	15 0 0
2	50	1⅝×1⅛	4×3	1¼	—	14 0 0	16 0 0
3	76	2½×1¾	6×4·5	1¾	2¼	17 0 0	19 0 0
4¼	108	3½×2½	9×6·5	2¼	2½	25 0 0	—
5½	140	4¼×3¼	12×9	2¾	3	38 0 0	41 0 0

f/2·5 **SERIES X** (Code-SPEEDIC)

1⅜	35	Kine	Kine	1¼	6 0 0	—
2	50	,,	,,	1¼	7 0 0	—
3	76	,,	,,	1½	8 10 0	—
4¼	108	2½×1⅝	6×4·5	2¼	12 10 0	—
5¼	133	3½×2½	9×6·5	2½	17 10 0	—
6⅜	162	4¼×3¼	11×8	3	21 0 0	—
7¾	197	5 ×4	12×9	3½	25 0 0	—
9¼	235	6½×4¾	16×12	4	35 0 0	—

f/2·9 **SERIES XIII** (Code-CORIC)

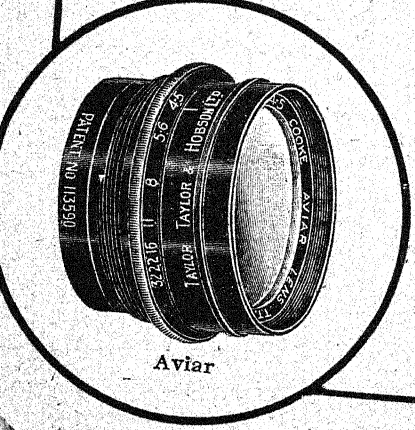
5	127	3⅛×2½	6·5× 9	2½	£12 15 0
6⅜	162	4¼×3¼	8 ×11	2¾	£13 15 0

TAYLOR-HOBSON COOKE AVIAR

f/4·5 SERIES II (Code-AVIAR)

f/6 } SERIES IIIB (Code-AVIARIC)
f/6·3 }

LENS	Approximate Equiv'nt Focus		Plate Covered at Full Aperture		R.P.S. Standard Flange-screw in Ins.		PRICES		
	Ins.	m/m	Inches	c/m	Std. Mt.	Snk Mt.	Either Standard or Sunk Mount	Sunk Focussing Mount	In Cells for Shutters
							£ s. d.	£ s. d.	£ s. d.
Series II f/4·5	3¾	95	3¼×2¼	8×6	1¼	—	6 0 0	—	4 15 0
	4¼	108	3½×2½	9×6·5	1¼	—	6 5 0	—	5 0 0
	5¼	133	4¼×3¼	11×8	1½	1¾	7 4 0	8 14 0	5 19 0
	6	152	5×4	12×9	1½	2	8 5 0	9 15 0	7 0 0
	7	178	6×4	15×10	1¾	2¼	10 5 0	12 5 0	8 15 0
	8¼	210	6½×4¾	16×12	2¼	2½	14 0 0	—	12 10 0
	12½	320	9×7	23×17·5	3½	—	28 0 0	—	—
	13½	342	10×8	25·5×20	3½	—	30 0 0	—	—
Series IIIB f/6·3	5¼	133	4¼×3¼	11×8	1¼	—	Standard Mounts only £ s. d. 5 9 0		4 4 0
	6	152	4⅞×2⅞	12·5×7·5	1½	—	6 5 0		5 0 0
	6⅝	168	5×4	12×9	1½	—	6 15 0		5 5 0
f/6	8½	218	6½×4¾	16×12	1¾	—	9 0 0		7 10 0
	10½	270	8½×6½	21·5×16·5	2¼	—	12 10 0		—
	12½	320	10×8	25·5×20	3	—	18 0 0		—
	15	380	12×10	30×24	3½	—	25 0 0		—



Aviar

Aviars are the "general utility" members of the Taylor-Hobson lens family. Land and seascapes, views from the air, sports subjects—architecture, home portraiture—all are equally well treated by Aviars. When it comes to enlarging, they are sure to reproduce in pictures many times larger than the originals all the pleasing features of their own negatives.

TAYLOR-HOBSON COOKE PORTRAIT

in three speeds, f/3·5, f/4·5, and f/5·6 with a simple diffusion control.

f/3·5 — **SERIES IIa** — (Code-PORTRIC)

Approximate Equivalent Focus		Plate Covered at Full Aperture		R.P.S. Standard Flange-screw	PRICE		
Inches	m/m	Inches	c/m	Inches	£	s.	d.
9½	240	6½ × 4¾	16 × 12	3½	24	0	0
10½	270	7 × 5	18 × 13	3½	28	0	0
12½	320	8½ × 6½	21 × 16	4½	36	0	0
15	380	10 × 8	25·5 × 20	5	52	0	0

f/4·5 — **SERIES IIb** — (Code-PORTRELLIC)

*10½	270	8 × 5	20 × 12	2¾	18	0	0
*12¾	325	9 × 7	23 × 17·5	3½	25	0	0
*15	380	10 × 8	25·5 × 20	4½	33	0	0
18	460	12 × 10	30 × 24	5	56	0	0
20	508	15 × 12	38 × 30	5½	Made to order only		

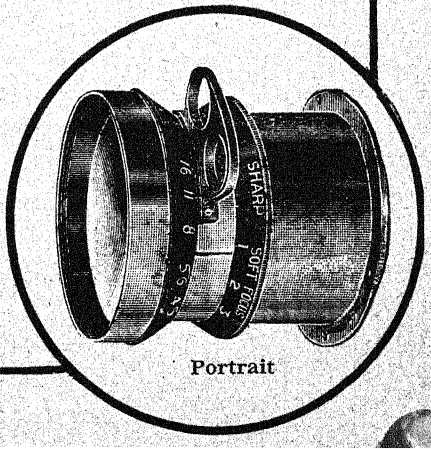
* If desired, these three sizes are supplied without the diffusion control, in light and compact mounts for home portraiture. The prices are the same as those given above.

f/5·6 — **SERIES VI** — (Code-PORTRONIC)

13	330	9 × 7	23 × 17·5	2¾	18	0	0
15½	393	10 × 8	25·5 × 20	3½	25	0	0
18	460	12 × 10	30 × 24	4½	35	0	0
22	559	15 × 12	38 × 30	5	Made to order only		

With a Taylor-Hobson Portrait lens the photographer can obtain at will a softly subdued image or utmost sharpness simply by turning the convenient finger-grip shown in the illustration.

When set to "SHARP" each lens covers sharply its specified plate when focussed on a far distant object. When focussed in the studio within say ten feet of the subject the lens covers at full aperture the next size of plate larger than the one listed. In all cases the longest possible focal length should be used so as to secure the best modelling.



Portrait

TAYLOR-HOBSON COOKE LENSES (*contd.*)

f/3·5 SERIES 11A (Code-PRESSIC)

Approximate Equivalent Focus		Plate Covered at Full Aperture		R.P.S. Standard Flange-screw in inches		PRICE					
						Standard Mount			Sunk Mount		
Ins.	m/m	Ins.	c/m	Standard Mount	Sunk Mount	£	s.	d.	£	s.	d.
5	127	$3\frac{1}{2}\times2\frac{1}{2}$	$9\times6\cdot5$	$1\frac{3}{4}$	$2\frac{1}{4}$	10	15	0	10	15	0
$6\frac{1}{4}$	158	$4\frac{1}{4}\times3\frac{1}{4}$	11×8	$2\frac{1}{4}$	$2\frac{3}{4}$	12	15	0	12	15	0
$7\frac{1}{2}$	190	$5\frac{1}{2}\times3\frac{1}{2}$	14×9	$2\frac{1}{2}$	$2\frac{3}{4}$	15	5	0	15	5	0

f/3·5 SERIES VIIIB Telephoto (Code-ELTIC)
f/5·6 SERIES VIII do. (Code-TELIC)

Aperture	Approximate Equivalent Focus		Plate covered at Full Aperture		Focus from flange-screw at infinity		R.P.S. Standard Fl'nge-screw	PRICE		
	Ins.	m/m	Ins.	c/m	Ins.	m/m	Ins.	£	s.	d.
f/3·5	8	203	$3\frac{1}{2}\times2\frac{1}{2}$	$9\times6\cdot5$	$4\frac{7}{8}$	124	$2\frac{1}{2}$	31	0	0
	$10\frac{1}{2}$	270	$4\frac{1}{4}\times3\frac{1}{4}$	11×8	$6\frac{1}{4}$	158	$2\frac{3}{4}$	40	0	0
f/5·6	$8\frac{1}{3}$	216	$3\frac{1}{2}\times2\frac{3}{4}$	$9\times6\cdot5$	$5\frac{1}{4}$	133	$1\frac{1}{4}$	11	0	0
	11	280	$4\frac{1}{4}\times3\frac{1}{4}$	11×8	$6\frac{3}{4}$	170	$1\frac{3}{4}$	13	0	0
	$12\frac{1}{2}$	320	5 ×4	12×9	$7\frac{1}{4}$	184	$1\frac{3}{4}$	14	10	0
	15	380	7 ×5	18×13	9	228	$2\frac{1}{4}$	20	0	0
	20	508	$8\frac{1}{2}\times6\frac{1}{2}$	$21\cdot5\times16\cdot5$	$12\frac{1}{4}$	312	$2\frac{3}{4}$	40	0	0

f/6·5 SERIES VIIB Wide Angle (Code-ANGLIC)

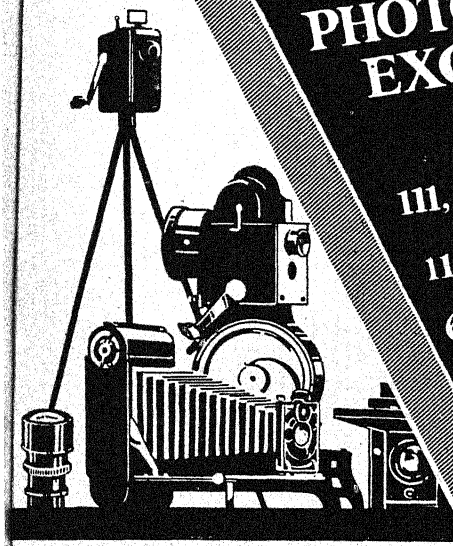
Approximate Equivalent Focus		Plate Covered at f/16		R.P.S. Standard Flange-screw	PRICE		
Inches	m/m	Inches	c/m	Inches	£	s.	d.
$2\frac{1}{2}$	63	$4\frac{1}{4}\times3\frac{1}{4}$	11×8	$1\frac{1}{4}$	8	0	0
$3\frac{1}{4}$	82	$5\frac{1}{2}\times3\frac{1}{2}$	14×9	$1\frac{1}{4}$	8	0	0
$4\frac{1}{4}$	108	$7\times5'_{1}$	18×13	$1\frac{1}{4}$	8	0	0
$5\frac{1}{4}$	133	$8\frac{1}{2}\times6\frac{1}{2}$	$21\cdot5\times16\cdot5$	$1\frac{1}{4}$	8	10	0
$6\frac{1}{4}$	158	10×8	$25\cdot5\times20$	$1\frac{1}{2}$	9	10	0
8	203	12×10	30×24	$1\frac{3}{4}$	11	10	0

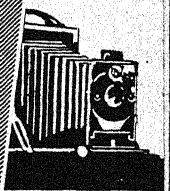
TAYLOR, TAYLOR & HOBSON, LTD
LEICESTER & LONDON
General Sales Dept.
74, Newman St. London, W.1.

The Westminster

PHOTOGRAPHIC EXCHANGE LTD.

111, OXFORD St., W.1.
119, VICTORIA St., S.W.1.
62, PICCADILLY W.1.



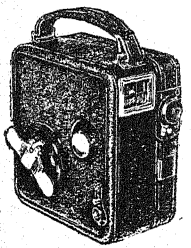


PHOTOGRAPHIC AND AMATEUR CINÉ APPARATUS

NEW & SECOND HAND

Phone & Grams :
OXFORD ST. :
GERRARD 1432
VICTORIA ST. :
VICTORIA 0669
PICCADILLY .
GERRARD 1360

The Westminster 62, PICCADILLY, W.1.

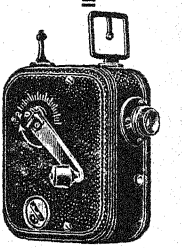


Moto Camera

THE PATHESCOPE MOTOCAMERA (9 m/m).

	£	s.	d.
Takes 30 feet non-inflammable film, daylight loading, enclosed clockwork motor, 1 wind to 1 reel of film, fitted F/3.5 anastigmat lens	10	10	0
With F/2.7 Zeiss Tessar	18	18	0
With F/2.9 Zeiss Triotar	14	14	0

THE BABY CINÉ CAMERA.



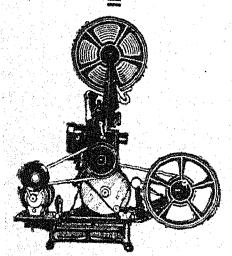
Baby Ciné

	£	s.	d.
With handle for use on tripod	5	0	0
Fitted "Motrix" Motor, for use in hand, 3 winds to one reel of film	7	2	0

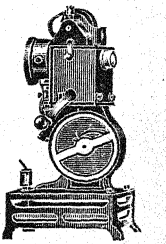
Films are in Chargers, ready for inserting in camera in daylight. Over 1,000 Pictures.

Films in Chargers 3/4 each. Developing and reversing ready for Projector 2/- each. Re-filling chargers 2/7 each.

THE PATHESCOPE PROJECTOR.



With Super Attachment



Pathescope

	£	s.	d.
For use on 100-volt electric light circuit	6	0	0
Resistance for higher voltages up to 250	0	10	0
Generator where no house current available	3	10	0
Super Reel Attachment for using 300 feet Reels	2	2	0
Complete set as illustrated with super reel and motor for 100 volt, ...	10	7	0
Picture reels, 30 ft., sport, travel, comedy, etc., 60 feet reels, 6/-; 300 feet reels, 27/6.	0	3	6
Resistance for motor and lamp, for higher voltages up to 250.	1	1	0

Full list of Pathescope and accessories post free.

THE CINÉ-"KODAK" (Model "B").

In its complete simplicity the Ciné-"Kodak," Model "B," is a delight to the user. Hand turning is entirely eliminated; the motive power is all in a spring motor which controls the timing as well. Load the camera with either 50 or 100 feet reel of Ciné-"Kodak" film, wind the spring, point the camera at the scene or subject, release the lever and the picture is made.

	£	s.	d.
With F/6.5 anastigmat lens	16	16	0
With F/3.5 ,, ,, ...	20	0	0
With F/1.9 ,, ,, ...	31	10	0
F/4.5 4 in. Dallon Telephoto for F/1.9 model	£9	10	0



Ciné Kodak 16 m/m

THE VICTOR CINÉ CAMERA

The Victor Ciné Camera combines in a single model, all the essentials for taking perfect motion pictures, with SLOW-motion and several other valuable and exclusive features.

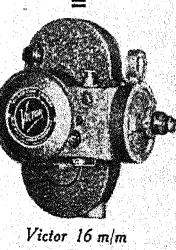
With F/3.5 Dallmeyer lens £46 0 0

The new 1/32 F/1.8 CINOPHOT exposure meter, used regularly, will prevent wasting a single film, 33/- in leather case.

100 feet reels Kodak Ciné film 16 m/m, 30/-.

100 feet ditto Panchromatic, 37/6.

Price includes Processing ready for Projection.



Victor 16 m/m

The Westminster 119, VICTORIA ST., S.W. 1.

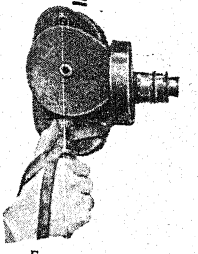
BELL-HOWELL "FILMO" (16 m/m).

Designed and built by the oldest and largest cinematograph camera manufacturer in the world.

	£ s. d.
Filmo 75. A beautiful and very portable Movie Camera, F/3.5 Cooke lens, in leather case ...	30 0 0
Filmo 70. The finest amateur Movie Camera made. F/3.5 Cooke lens	54 0 0



Filmo 75.

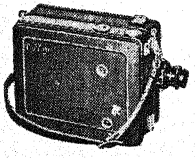


Eyemo. 35 m/m

DE VRY CINÉ CAMERA (35 m/m).

	£ s. d.
Spring driven, 50 feet, one winding or hand cranked if desired. F/3.5 Dallmeyer lens	45 0 0
Bell Howell "Eyemo" (35 m/m), entirely automatic. F/2.5, Cooke lens	82 10 0

The "De Vry" and "Filmo" each carry 100 feet Kodak ciné film, daylight loading, **£1 11 0** per reel.

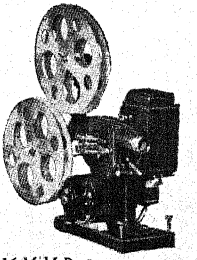


De Vry 35 M/M.

DE VRY CINÉ PROJECTOR (16 m/m).

The new De Vry Projector weighs only 7½ lbs.

	£ s. d.
Complete with motor and F/1.8 Dallmeyer lens for 110 volts	30 0 0
Resistance for voltages up to 250... ...	1 12 6

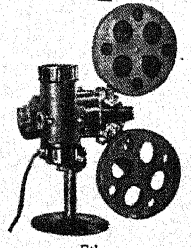


16 M/M De Vry Projector.

FILMO PROJECTOR (16 m/m).

Will throw a flickerless picture up to 9×12 feet.

	£ s. d.
For use on 100 volt circuit	61 10 0
Resistance for voltages up to 250	3 10 0



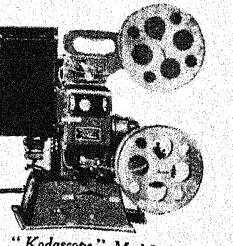
Filmo.

KODASCOPE PROJECTORS (16 m/m).

	£ s. d.
Model A. Strongly made and suitable for all purposes	55 0 0
Model B. Entirely automatic with self-threading device	89 10 0
Model C. Very compact and inexpensive	18 0 0

All above include motors for house circuit up to 120 volts.

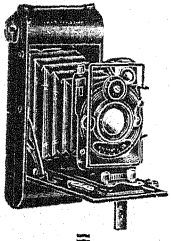
Resistance for higher voltages up to 250 volts. Model A and B, **£3 7 6**; Model C, **£1 12 6.**



"Kodascope" Model A.

Send for list of all the latest Amateur Ciné Apparatus, free on request.

The Westminster 111 OXFORD ST., W.1.



ENSIGN CARBINE ROLL FILM.

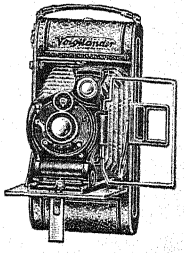
No. 6 is a most complete little camera of special construction. All-metal body, leather covered, rising front. Radial focussing adjustment. Compur shutter.

3¼×2¾ Roll film.

	£ s. d.	Tropical Model. £ s. d.
F/4.5 Aldis Uno	7 7 0	—
F/4.5 Ross Xpres... ...	10 17 6	12 7 6
F/4.5 Aldis-Butcher ...	8 17 6	10 10 0

Full List of Ensign Carbine Cameras on application.

VOIGTLÄNDER ROLL FILM.

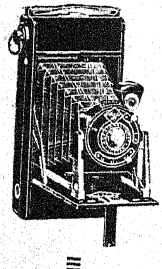


The Perkeo, metal body, leather covered. The moment a button is pressed at side the camera is open ready for use,

F/6.3 Voigtar lens, 3-speed shutter, 3¼×2¾ **£5 5 0**

Standard Models are supplied in sizes 3×2, 3¼×2¾ and 4¼×2½, with F/4.5 Skopar lens and Compur Shutter. Prices, **£6, £6 17s. 6d., and £7 12s. 6d.**; or Heliar F/4.5 lenses, prices, **£8 17s. 6d., £9 12s. 6d. and £12 15s.** respectively.

Full List of all Voightländer products post free.



AGFA SPEEDEX ROLL FILM.

The best value ever offered.

3¼×2¾. F/8.8 Anastigmat lens, 3-speed shutter, press button, push-down baseboard and camera is ready for use **£2 12 6**

Leather Case **8/6.**

ZEISS IKON ROLL FILM.



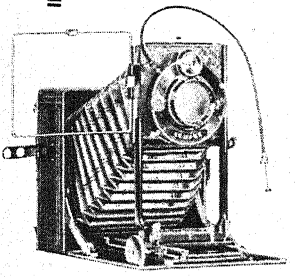
All metal body, leather covered. F/4.5 Zeiss Tessar lens, compur shutter.

	£ s. d.		£ s. d.
Vest Pocket Icarette ...	11 0 0		
3¼×2¾ Icarette	11 2 6	with double extension ...	13 10 0
2½×4¼ ,,	10 15 0		
4¼×3¼ Lloyd ...	14 0 0	Nixe with double extension ...	16 2 6
5½×3¼ ,, ...	17 0 0	,, ,,	18 7 6

Full Lists of Zeiss Ikon Products post free.

Retail Agents for "SATRAP" roll films and Film Packs. Standard prices.

The Westminster 62, PICCADILLY, W. 1.



"LINHOF" UNIVERSAL.

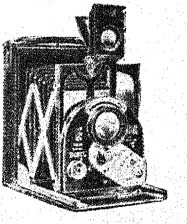
Made to meet the requirements of the most exacting photographer. Revolving back, Drop baseboard, Swing front, All-metal body, removable lens panel. Complete 3 slides.

		£ s. d.
3½×2½.	F/4.5 Zeiss Tessar Compur shutter	22 15 0
	F/6.3 Zeiss Double Protar Compur shutter	27 5 0
,,	Camera and 3 slides only ...	13 10 0
4¼×3¼.	F/4.5 Zeiss Tessar Compur shutter	25 10 0
,	F/6.3 Zeiss Double Protar Compur shutter	30 0 0
,,	Camera and 3 slides only ...	15 15 0

Full Particulars on application.

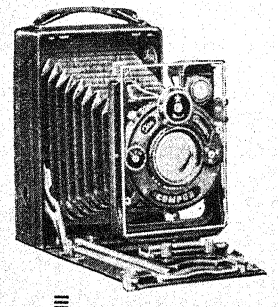
N. & G. "SIBYL" FOLDING POCKET.

Light, Compact and Accurate.



	F/4.5 Ross Xpres. £ s. d.	F.P. adapter. £ s. d.
Baby Sibyl, 4½×6 c/m ...	19 5 0	0 18 6
New Special, 3½×2½.. ...	23 0 0	1 10 0
New Ideal, 4¼×3¼	25 0 0	2 0 0
New Sibyl Vitesse, 3½×2½.	F/3.5 Xpres	**£30.**

Full List of N. & G. Cameras on application.



ZEISS IKON FOLDING PLATE CAMERAS.

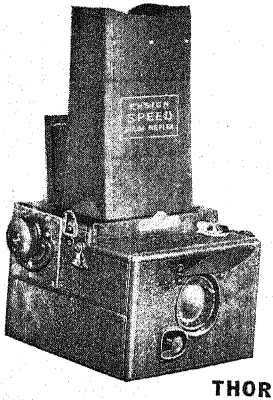
F/4.5 Zeiss Tessar in Compur Shutter.

	3½×2½ £ s. d.	4¼×3¼ £ s. d.
The Maximar	9 15 0	11 0 0
The Ideal	13 5 0	17 10 0
The Tronar	10 12 6	13 0 0

Full List of Zeiss Ikon Cameras post free.

SECOND-HAND APPARATUS. A special feature is made of the Sale and Exchange of used apparatus. Second-hand apparatus sold by the "Westminster" is thoroughly overhauled before sale. Send for the Westminster Catalogue of Photographic Bargains, which contains particulars of all the money-saving apparatus held at all "Westminster" Branches.

The Westminster 119, VICTORIA ST., S.W. 1.



The "Westminster" specialize in Reflex Cameras and hold a full range of all the latest models.

ENSIGN SPEED FILM REFLEX.

Daylight loading, roll film, focal plane shutter, 3¼×2¼.

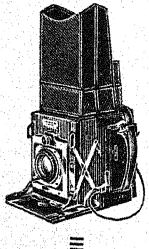
			£ s. d.
Aldis Butcher.	F/4.5 lens	... ...	10 10 0
"	F 3.5 "	... ...	12 12 0
Ross Xpres.	F/4.5 "	... ...	14 10 0

ENSIGN SPECIAL TROPICAL REFLEX.

Body in teak, brass bound, focal plane shutter.

			3½×2½ £ s. d.	4¼×3¼ £ s. d.
Aldis Butcher.	F/4.5	...	18 0 0	19 0 0
	F 3.5	...	20 0 0	22 0 0
Ross Xpres.	F/4.5.	...	22 0 0	23 15 0

THORNTON PICKARD JR. SPECIAL RUBY.



T. P. Cooke. F/4.5

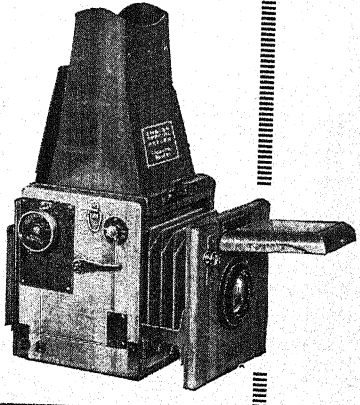
3¼×2¼	4¼×3¼
£ s. d.	£ s. d.
11 5 0	12 0 0

Dallmeyer. F/4.5

11 5 0 12 0 0

Bijou Ruby Reflex, 4½×6 c/m. F/2.5. Taylor Hobson lens, **£30 0 0**

Dallmeyer Baby Speed Reflex, 4½×6 c/m. F/2.9. Pentac lens **£33 0 0**



The N. & G. FOLDING REFLEX

3¼×2½

Compact and light, and constructed with the utmost scientific accuracy it is possible to obtain.

Camera complete, with three N. & G. double metal book-form dark slides, dark slide adapter, and hooded focussing screen.—

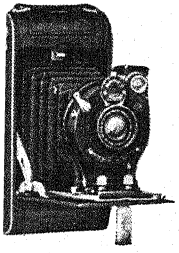
	£ s. d.
Fitted Dallmeyer Pentac F/2.9 5½ in. focus ...	58 0 0
Fitted T.T.H. Aviar F/4.5 5¼ in. focus ...	46 10 0

THE "WESTMINSTER" EASY PAYMENT SYSTEM.

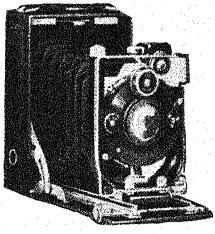
The "Westminster," recognising that it is not always convenient to pay the full purchase price in one sum, accepts monthly payments to suit customers' convenience (Great Britain only). There are no worrying enquiries. Order form and full particulars upon request. The Company finances all its Instalment Business.

The Westminster 111, OXFORD ST., W. 1.

THE Nagel CAMERAS.



A new series of roll film and plate Cameras that embody many ingenious ideas.



THE NAGEL ROLL FILM.

The smallest 3¼×2¼ roll film Camera obtainable, all metal body, leather covered.

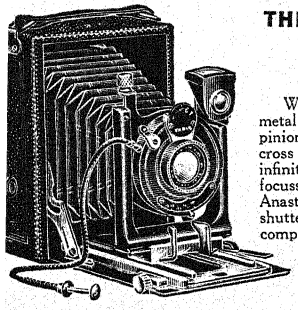
No. 65. F/6.8 Anastigmat lens, 3-speed shutter	3	7 6
No. 74A. F/4.5 Anastigmat lens, 7-speed shutter	6	12 6
No. 74B. F/4.5 Anastigmat lens, Compur shutter ...	7	2 6
With Dallmeyer F/4.5 Anastigmat lens A	7	10 0
B	8	0 0

THE NAGEL FOLDING PLATE.

An elegant Camera with Double Extension metal body, leather covered.
No. 18. F/4.5 convertible lens in compur shutter ... **£9 10 0**

Other sizes in course of manufacture.

Send for full particulars before selecting your new Camera.



THE "OXFORD" FOLDING PLATE AND FILM-PACK CAMERA.

(Foreign Made).

The Finest and Best Value Obtainable.

Wooden body, fine morocco grained covering, metal drop baseboard, duoble extension, rack and pinion focussing, U-shaped front with rack rising and cross front movement, brilliant reversing view-finder, infinity catch and focussing scale, deep hooded back focussing screen, handle for carrying. Finest quality Anastigmat lens working at F/6.8 in speeded Everset shutter, 1/25th, 1/50th, 1/100th sec., and also B. and T. complete with wire release and three single dark slides.

		Extra Slides.	Film-Pack Adapters.	Leather Cases.
3½×2½	52/6	2/6	5/6	8/6
4¼×3¼	52/6	2/6	5/6	9/6

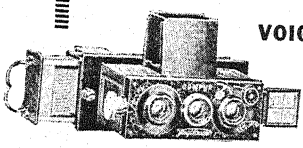
The **"Oxford Super,"** 3½×2½, with D.V. view-finder and F/4.8 anastigmat lens :—

4-speed shutter	4	10	0
6-speed shutter	4	17	6

The Westminster have a wide range of carefully selected Albums, either to slip-in or paste in with loose or fixed leaves, to cover all possible requirements.

Enquiries are invited.

The Westminster 62, PICCADILLY, W.1.



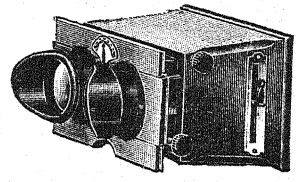
VOIGTLÄNDER STEREFLECTOSCOPE.

For Plates and Film-Packs. The Smallest and most compact Stereo-Reflex.

The body is constructed entirely of light metal and is of the finest optical-mechanical workmanship. Suitable for all climates. Fitted with 3 Heliars F/4.5. In Stereo-Compur shutter, including Changing-box for 12 plates. Wire release and carrying case.

45 × 107 mm. **£30.** 6 × 13 cm. **£36 5.**

STEREOSCOPES.

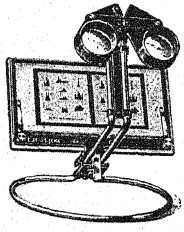


The **"Standard"** in polished mahogany, adjustable eye centres, interchargeable long or short focus lenses.

45× 107 m/m	...	**£3 5 0**
6× 13 c/m ...	...	**£3 10 0**
7× 13 c/m ...	...	**£3 10 0**

Short or long focus lenses for either size, **27/6** pair.

Other patterns from **25/-**.



ZEISS STEREOSCOPE.

For all size Transparencies or Solid Prints, adjustable lens centres, with long or short focus lenses **£6 15 0**

Extra short or long focus lenses, **20/-** pair.

THE "PLANOX" STEREO VIEWING CABINET.

Special Features.

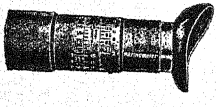
6×13 cm. and 45×107 mm. Stereos can be viewed in any order. The only stereo cabinet with this feature. Takes 140 views. Unique and infallible magnetic changing device. Adjustable eye centres, focussing movement and numbered indicator. Many special accessories available. Binocular projection. Single lantern projection, etc., **£16 17 6.** Full particulars upon application.

THE "LIOS" EXPOSURE METER.

An entirely new optical Exposure Meter, simple in use and very accurate, **18/6.** Soft deerhide purse, **2/6.**

The **"Justophot"** Exposure Meter gives a measure of the brightness of the light radiated from the subject to be photographed, **24/-** in case.

DISTANCE METERS.



Enables you to set your camera for the correct distance with absolute precision.

"Leitz" Meter. The scale reads from 3 ft. to 100 ft., and has fitting for attaching to camera **£1 17 6**

"Heyde" Photo Telemeter. The scale reads from 4 ft. to 100 ft., and 1 meter to 20 meters **£1 12 6**

Goerz Meter, 4 ft. to 100 ft. **£1 18 6**

A Case is included with each.

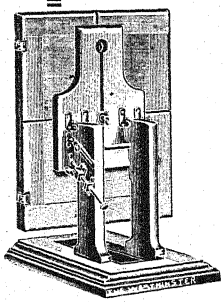


Retail Agents for the world famous JOHNSTON'S "SNOW WHITE" INK for Albums, Mounts, Films, Movie Titles, etc., in opal jar with brush, pens, etc., and directions, 1/6.

The Westminster 119, VICTORIA ST., S.W.1.

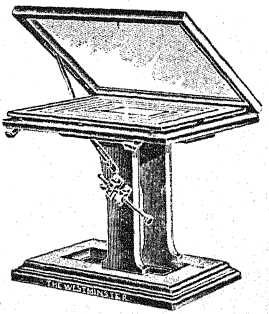
THE WESTMINSTER DE LUXE ENLARGING EASEL.

(Registered Design).



Back view showing new system of hinges, etc.

The new 1929 Improved model Westminster Enlarging Easel is the last word in practical utility. The old model was universally acknowledged to be the finest easel obtainable, but after careful and prolonged experiments by expert members of our technical staff, certain improvements have been designed and carried out which now places this new model years ahead of all other enlarging easels. It is now constructed of seasoned, polished light oak, and embodies an entirely new front and method of hinging.

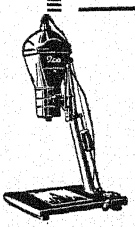


Showing front open for receiving paper

SALIENT FEATURES.

Absolute rigidity. Rising and falling front. Tilting and rotating movement (spring ball lock for centering), special spring pressure board ruled for all sizes up to 15×12, with special hinged glass front, supported by sliding strut, which leaves both hands free for placing paper in required position. Rapid in use. Accurate in register.

PRICE - £3 15 0



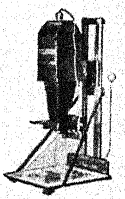
"MIRAPHOT" ENLARGER.

Entirely automatic, will take 9×12 c/m negatives or smaller, and make enlargements approx. 3½ linear.

F/6.8 Novar Anastigmat lens **£8 7 6**

F/4.5 Zeiss Tessar **£11 12 6**

"SIMPLEX" ENLARGER.



Entirely self-contained. Complete with F/6.8 Anastigmat lens and 15×12 easel.

3½×2½ ... **£4 10 0** 4¼×3¼ ... **£4 15 0**

6½×4¾ without easel ... **£7 10 0**

Special Demonstration Rooms

Are now at your service at all branches where demonstrations of amateur ciné apparatus, enlarging and projection lanterns are given daily from 9 a.m. to 6 p.m.

The Westminster 111, OXFORD ST., W.1.

ZEISS IKON KINAMO S 10 (16 m/m.)

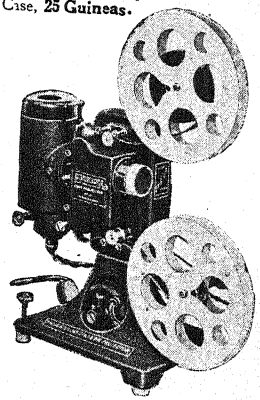
Extremely Compact Camera. Size $4\frac{1}{4} \times 3\frac{1}{2} \times 2\frac{3}{8}$. Weight 2 lbs. Clock-work motor, F/2.7 Zeiss Tessar lens. Uses 16 m/m ciné film in 32 feet lengths which will be marketed by the Kodak Coy.
Price **£20 0 0**

ENSIGN AUTOKINECAM (16 m/m).

An English made Ciné Camera, fitted F/2.6 Anastigmat lens, clockwork motor with speeds for normal slow and fast motion work, in Leather Case, **25 Guineas.**

ENSIGN "SILENT SIXTEEN" (16 m/m).

An English made ciné projector with F/1.8 Projection lens complete with Electric Motor suitable for all voltages. Full Particulars on application. **25 Gns.**



Silent Sixteen.

THE KINO-PANO TRIPOD.

A sturdy wood tripod, aluminium extension and reversible legs with steel points or rubber tips. Tilt and panoram head. weight $4\frac{3}{4}$ lbs. **£8 0 0**

THE "CORINTHIAN" TRIPOD.

Solid brass polished tubing, automatic double spring catches. Top outer section covered dull black, fluted composition, fluted from bottom to top, surmounted by nickelled brass top, designed so that it is impossible to work loose.

			s.	d.
4 sect.	$15\frac{1}{2}$ closed,	$48\frac{1}{2}$ open	**10**	**6**
5 ,,	$14\frac{1}{2}$,,	$50\frac{1}{4}$,, ...	**13**	**6**
7 ,,	$11\frac{1}{2}$,,	$48\frac{1}{2}$,, ...	**15**	**0**



WALKING STICK TRIPOD.

Made in light metal, splendidly finished and polished to represent walking stick, 35 in. closed, extended to 46 in., weight 16 ozs. ... ... **18/6.**

DALLMEYER SNAP SHOT CAMERA.

Nothing to learn! Nothing to forget! Failure impossible! A camera of the simplest type. F/6 Dallmeyer lens. No distances to measure, no focussing scale. All metal, light and portable, weighs 11 ozs. Takes $3\frac{1}{4} \times 2\frac{1}{4}$ film packs. In soft case **£5 5 0**

APPARATUS ON APPROVAL. To those unable to make a personal selection the "Westminster" offer a free trial of any of their second hand Cameras. Deposit value, and the apparatus will be sent on approval. 3 days London, 7 days country. We refund remittance in full upon receipt of apparatus returned from approval, in good condition and carriage paid within the agreed period.

The Westminster

62, PICCADILLY, W.1.

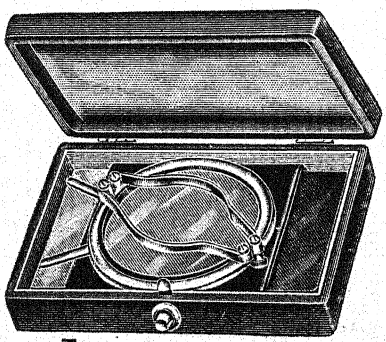
Selection from our Library

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Commercial Photography. David Charles	5	0
Complete Photographer. R. Child Bayley	15	0
From Landscape to Studio. Reginald Belfield	12	6
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Photography, Its Principles and Application. Alfred Watkins	12	6
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Photographic Enlarging. R. Child Bayley	3	0
Dictionary of Photography. E. J. Wall and F. J. Mortimer	10	6
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Send for Special List of Books.



ORTHOPLAN GRADUATED LIGHT FILTERS.

These filters are made of pure coloured optical glass, spectroscopically tested and coloured in its entire mass, cut and worked to absolutely parallel plane faces, perfectly polished and produced by a new method, so that two-thirds of the filter is yellow and one-third white. It is impossible for faults in surfaces or colouring to occur. Affected neither by heat, moisture or extremes of atmosphere. Complete in adjustable holders and hinged stiff snap cases.

Size of Filter in m/m.	s.	d.
25 × 45	8	6
30 × 55	10	6
40 × 70	16	0
45 × 75	18	0
60 × 90	27	6
75 × 100	38	6

The Westminster 111, OXFORD STREET, W.1.

The "WESTMINSTER" GASLIGHT PAPER

50 per cent. more pieces than usually supplied in standard makes.

The "Westminster" Gaslight Paper and Post Cards are British made, and are as good as gaslight paper and postcards can be. It is perfectly simple to work, will not stain, gives great latitude in working, and no dark room is necessary. They can be used in any ordinary room, providing no direct rays are allowed to fall on the paper until they are in the Fixing Solution. Approximate exposure at 12 inches from incandescent burner or 32 c.-p. electric lamp, 10 secs.

Any ordinary non-staining developer will do, but **The "Westminster" Gaslight Developer** is recommended for the best results.

Full Directions Enclosed in Each Packet.

YOU CANNOT OBTAIN A BETTER PAPER.

Made in three grades, **Soft** for hard negatives, **Normal** for average negatives, and **Vigorous** for thin, flat negatives; and in three surfaces—Matt, Glossy and Velvet.

		Pkt.			Pkt.
2¾ × 1¾ ...	36 sheets	**6d.**	9 × 12 cm. ...	23 sheets ...	1/-
3¼ × 2¼ ...	40 ,, ...	1/-	5 × 4 ...	16 ,, ...	1/-
4½ × 2¾ ...	28 ,, ...	1/-	5½ × 3½ ...	18 ,, ...	1/-
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Post Cards, 15 sheets, **1/-** packet.

Post Cards in packets of 100 cards, **3/9,** postage **6d.**

"Westminster" Gaslight Developer, 3d.; 1/6 box of 6.

Sample packet of Paper and Developer as above will be sent post free on receipt of **1/3** anywhere in Great Britain.

THE "WESTMINSTER" PLATE

Foreign Made.

Guaranteed Quality.

Non-screen. Anti-Halo. H.D. 450. Box of 12.		**Equal to Any.**	**Better than Many.** Box of 12.
6 × 4¼ cm.	1/-	5½ × 3½ and 5 × 4	3/-
3¼ × 2¼	1/3	10 × 15 cm.	3/2
4¼ × 3¼	1/9	6½ × 4¾	4/-
9 × 12 cm.	2/3	8½ × 6½	7/-
Black Tone Lantern Plates		... ...	1/8

Three Boxes Post Free U.K. **Obtainable at all Branches.**



THESE few pages do not even touch the fringe of the large and comprehensive stocks held by the "Westminster," who can supply anything of a Photographic nature.

The "Westminster" Bargain Catalogue, the finest list ever offered to camera enthusiasts, describes the present unexampled range of photographic apparatus and the various inexpensive appliances which have been designed for the assistance of photographers, amateur and professional. Lists will be sent Post Free if you write to Dept. D of any branch of the "Westminster."

THE WESTMINSTER PHOTOGRAPHIC EXCHANGE Ltd.

119, VICTORIA STREET, S.W.1. 62, PICCADILLY, W.1.

111, OXFORD ST., W.1.

JOHNSON & SONS

MANUFACTURING CHEMISTS LTD.

BRITISH-MADE DEVELOPERS.



METOL-JOHNSONS.

The very high standard of purity and reliability that is consistently maintained in the manufacture of METOL-JOHNSONS has gained for this developer a world-wide reputation. It is *the pure Monomethyl-paramidophenol Sulphate*, and can therefore be used with absolute confidence in any formula, either combined with Pyro or Hydrokinone, or alone as a METOL Developer, and perfect results are assured in either negative or print work.

METOL-JOHNSONS is of particular value to all Process Workers and to Trade Printers as it is recognised as the most economical and satisfactory developer.

METOL-JOHNSONS is packed in the standard sizes from 1-oz. to 16-ozs.; also ½ and 1-Kilo.

AMIDOL-JOHNSONS.

This Developer occurs in the form of clean White to Grey Crystals, easily and completely soluble. Every batch is tested chemically and photographically to maintain the high standard of efficiency which is always to be found with Johnson's Developers.



AMIDOL-JOHNSONS is recognised by all Professional Photographers and Trade Workers to be without equal as a Developer for Bromide work. Prints developed with this have rich shadow details, clean high lights and a long range of half-tones so necessary in pictorial work.

Packed in bottles from 1-oz. to 16-ozs., or ½-Kilo and 1-Kilo.

ACID PYROGALLIC.

JOHNSON'S.

This is the heavy crystal form of Pyro which is now so much preferred owing to the ease with which small quantities can be weighed. The crystals dissolve quickly and completely and JOHNSONS-PYRO, when used as an ordinary Pyro-Soda or Pyro-Metol Developer gives high quality negatives that will please the most critical Photographer.

PYRO-JOHNSONS is packed in bottles from 1-oz. to 16-ozs., or in tins from 1-lb. upwards.

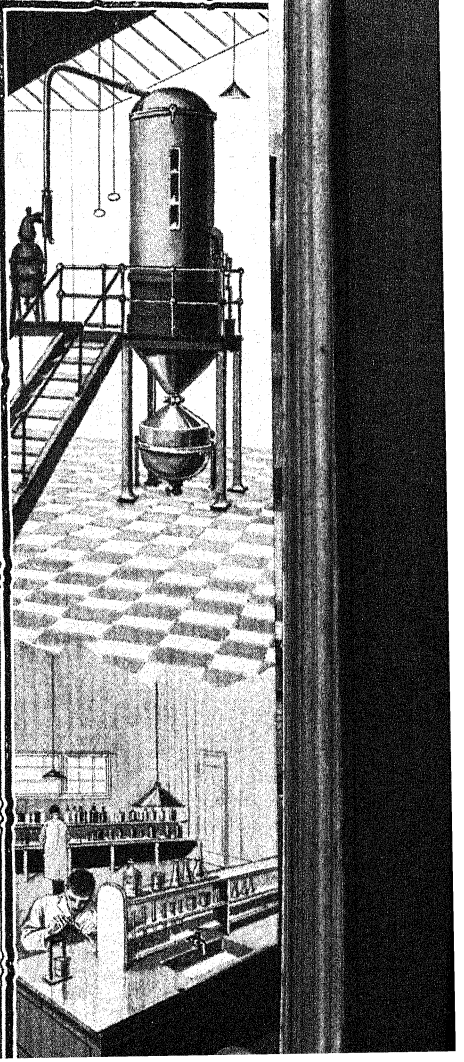
GLYCIN-JOHNSONS.

GLYCIN-JOHNSONS is a very pure developing agent and is becoming very popular both for negative and print work. With each bottle formulæ are given, including one for obtaining warm tones on the Chloro-Bromide papers.

AZOL—The correct Developer.

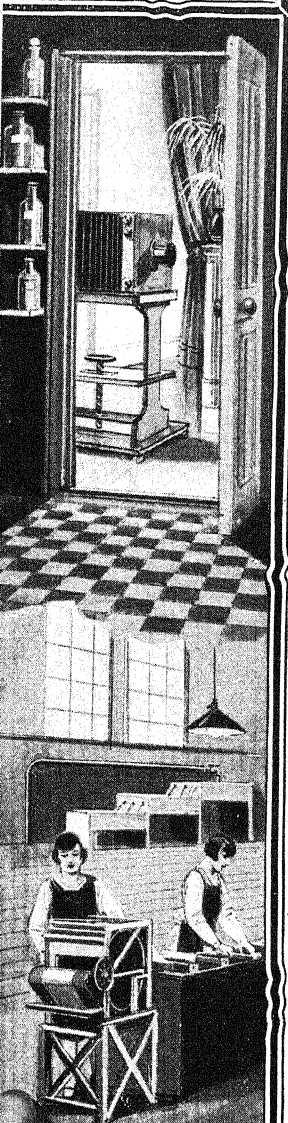
Many Professionals are now using AZOL for obtaining "soft" negatives of subjects which, owing to strong lighting or contrasts, would yield hard results, or where fine gradation is required, for it is generally recognised that with this Developer a long line of gradation is obtained.

AZOL is packed in 3-oz., 8-oz., and 16-oz. bottles.



JOHNSON & SONS

MANUFACTURING CHEMISTS LTD.



CHEMICALS FOR D. & P. TRADE.

TANK DEVELOPERS.

The chemicals employed in these are in powder form, easily dissolved in the necessary amount of water. The bath is for normal development of 15 to 20 minutes, or for quick strength from 8 to 10 minutes, and the quantity of spools that can be correctly developed in these tank developers averages 25 to 30 assorted spools per gallon.

In tins to make 5, 10, 20 and 40 gallons normal solution.



GASLIGHT DEVELOPER

Has proved its worth. Prints developed with it are full of pictorial quality, free from stains and of a richness that will please the most critical worker.

No. 1 to make 1 gall. for vigorous or 2 galls. for soft Grades.
No. 2=5 galls., vigorous, 10 galls., soft.
No. 3=10 galls., vigorous, 20 galls., soft.
No. 4=20 galls., vigorous, 40 galls., soft.



ACID FIXING POWDER

JOHNSON'S ACID FIXING BATH is strongly recommended because it is quick in action, not excessively acid, retains its working properties for a very long time, and produces clean, bright prints and negatives. In tins, 5, 7, 10 and 14 lbs.

ILFORD TROPICAL HARDENER.

For years Photographers, especially those in tropical countries, have found great benefit from the use of this hardening bath, it overcomes the difficulties experienced with films and plates when working in high temperatures. Where quantities of amateur films have to be developed it enables the films to be dried much quicker and by artificial heat.

One pint makes one gallon.



JOHNSON'S GLAZING SOLUTION

This is a highly concentrated solution for use on either Glass or Ferrotype Plates, giving a perfect glaze on any make of paper. A Winchester Quart (½-gallon) makes 5-gallons solution.

JOHNSON & SONS

MANUFACTURING CHEMISTS LTD.

TRADE MARK

CHEMICALS FOR PROCESS ENGRAVING, ETC.

NEGATIVE COLLODION



The manufacture of NEGATIVE COLLODION is very exacting and the greatest care must be given to the solution of and the standardization of all its ingredients. Only experts who have practical knowledge of what COLLODION is expected to do are allowed to participate in the manufacture of JOHNSON'S NEGATIVE COLLODION, and during the last few years the output has considerably increased. COLLODION orders of any size can be executed immediately.

IRON PERCHLORIDE.

Here again uniformity of quality is the chief aim, and JOHNSON'S IRON PERCHLORIDE is guaranteed suitable for all classes of work. Johnson's have a special quality for Photogravure Etching.

JOHNSON'S SILVER NITRATE

Is known throughout the world; it is the hall-mark of purity and reliability. Under the same "Scales Brand" trade mark the following standardized Process Chemicals are supplied:—

Albumen.
Ammon. Bichromate.
Beeswax.
Bitumen.
Dragon's Blood.
Gums.
Potass. Bichromate
Potass. Bromide.
Potass. Cyanide
Process Glue.
Varnishes,
Etc., Etc.

PHOTO COPYING DEVELOPER.

This Developer is for the machines that are now so much in use for the copying of Plans, Documents, etc. It is packed in various tins to make the quantities required by each size machine.

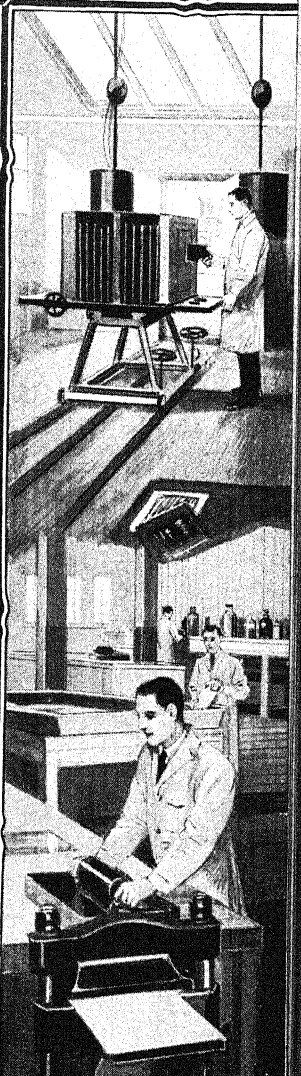
JOHNSON'S VARNISHES.

The series include Dry Plate, Matt, Crystal, Dammar, Retouching Medium, Spotting Medium, DeadBlack and White Ink.



X-RAY DEVELOPER.

A perfectly well-balanced formula for all Radiographic plates. It is used in large quantities in Military and other Hospitals.



TRADE MARK

JOHNSON & SON

MANUFACTURING CHEMISTS LTD.



CHEMICALS FOR THE AMATEUR

VEDOL SCALOIDS.

VEDOL is of very great convenience to all amateur photographers who have limited dark-room accommodation. VEDOL can be used for Plates, Films, Bromide and Gaslight papers. Scaloids enable fresh solution to be made just the time of using.

Each carton makes 100-ozs. of solution. No other chemicals are required.

CARTRIDGE DEVELOPERS.

The AMIDOL Cartridge will be found to be of particular interest to all Bromide workers.

Each of the tubes contains a complete Developer and being packed in glass its keeping qualities are preserved almost indefinitely. The same applies to the Metol-Quinol developer cartridge which again is self contained, and this formula is one that works excellently with every make of Gaslight Paper.



JOHNSON'S FLASHPOWDER

Is still the most suitable and reliable for successful indoor photography. Complete instructions and exposure tables are enclosed with each package.



JOHNSON'S MOUNTANT

JOHNSON'S PHOTOGRAPHIC MOUNTANT has stood the test of over 30 years and is still the most popular photographic paste because it is absolutely free from acid or any chemical that would cause deterioration of the print.

Packed in tubes and pots.

PHOTO TINTS and PASTELS

For the tinting of Lantern Slides, Bromide and Gaslight prints, a very complete range of Tints is included in both the Photo Tints and Pastels, and work with either is very simple and becomes very fascinating.

KOSMOS



REGD. TRADE MARK

Makers of

Kosmos Negative Paper
Kosmos Negative Card
Kosmos Vitegas-de-Luxe
Kosmos Vitegas
Kosmos Bromide
Kosmos Novex

Kosmos Photographics Ltd.
LETCHWORTH · HERTS.
And 155 Victoria Street, London, S.W.1
Telephones: LETCHWORTH 128 and VICTORIA 2685

KOSMOS

KOSMOS Negative Card

A special fine-grain negative base, coated with a fast emulsion suitable for every class of portrait work. For quick work its advantages over plates and automatic machines are countless. It is cheaper than plates, and an unlimited supply of prints can be made from the same negative. The image is not reversed and will readily take pencil, brush, or knife work. The negatives take a minimum of storage space: in fact, the negative file can even replace the card index if data and particulars are recorded on the backs of the negatives.

Supplied in sheets or strips of all current sizes.

KOSMOS Negative Paper

A slower emulsion than the previous, coated on fine-quality paper, and intended chiefly for technical and scientific photography.

In the form of rolls, its reliability has been amply put to the test in recording instruments, and in cut sizes and strips it is extensively used for the reproduction of plans, technical drawings, and documents of all sorts.

By reason of its contrast, Kosmos Negative Paper has also found a place in the cinema industry as a substitute for celluloid film.

Supplied in cut sizes, strips, and rolls of any dimensions.

KOSMOS

KOSMOS Vitegas de-Luxe

By reason of its rich warm tones and delicate scale of gradation, VITEGAS-de-LUXE is becoming increasingly popular with photographers who wish for a medium that will not only do full justice to their negatives, but will lend a distinctive quality to their work. Indeed, VITEGAS-de-LUXE can be used with any warm-tone developer, and by using his own formula the photographer can produce any tone he desires.

VITEGAS-de-LUXE is coated on base specially selected for its adaptability to brush and knife work, a fact which is particularly appreciated in the new enlarging speeds.

VITEGAS-de-LUXE surfaces: (contact and enlarging)

White Pebble-grain Card	*12B*
Cream Smooth Card	*14B*
Cream Rough Card	*18B*

KOSMOS Vitegas

The original chloro-bromide, VITEGAS is made in an exceptionally large number of surfaces suitable for every style of pictorial photography. It yields a beautiful warm-black image and will tone readily to a pleasing sepia without any loss in depth

VITEGAS surfaces:

	Paper	*Card*
Glossy	*1A*	*1B*
Velvet	*2A*	*2B*
Semi-matt	*3A*	*3B*
Pearl matt	*5A*	*5B*
Cream Smooth	*7A*	*7B*
Cream Natural Surface	—	*8B*
Cream Velvet	—	*10B*
Ivory Smooth matt	*55A*	*55B*
Ivory White	—	*56B*

Supplied in two grades—Normal and Contrasty.

KOSMOS

KOSMOS Bromide

Each surface is made in four grades of contrast, enabling the production of good prints from any negative, and the large choice of surfaces make the use of KOSMOS BROMIDE possible in almost every branch of photography. The new mauve-tinted glossy paper has become extremely popular for process work.

BROMIDE surfaces:	*Paper*	*Card*
Glossy	*101A*	*101B*
Velvet	*102A*	*102B*
Semi-matt	*103A*	*103B*
Natural Surface	*104A*	*104B*
Matt	*105A*	*105B*
Cream Smooth Matt	*107A*	*107B*
Cream Natural Surface ...	—	*108B*
Cream Velvet	—	*110B*

KOSMOS Novex

Produced with the assistance of actual users, NOVEX is a gaslight of exceptional speed, latitude, and freedom from stains. It yields attractive blue-black tones in ordinary M.Q. developer, and is made in three grades of contrast, so that bright prints can be produced from the poorest negative. It is just as popular with the amateur as with the D. and P. worker, and has been aptly termed the ideal D. and P. paper.

NOVEX surfaces:

Glossy, Velvet, and Matt. Each surface is made in Soft, Normal, and Contrasty, and each surface and grade in Paper, Medium Weight, and Card.



"THE AMATEUR CINE PEOPLE"

WALLACE HEATON LTD

AND EVERYTHING FOR PHOTOGRAPHY

CONTRACTORS
TO H.M. GOVERNMENT.

Specialists in
PHOTOGRAPHIC &
CINEMATOGRAPH APPARATUS,

COMMERCIAL PHOTOGRAPHERS,

PROCESS ENGRAVERS,

PHOTO FINISHERS.

Dealers in all classes
of New & Second-
hand Cameras.

PATRONISED BY
ROYALTY.

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& 47 BERKELEY ST. LONDON W.1.

Bond Street Branch two minutes from Oxford Street. Berkeley Street Branch next to

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THE SERVICE WE OFFER YOU.

SERVICE - - WE offer you what we believe to be the quickest, fairest and most intelligent photographic service in the Kingdom. All Developing, Printing, Enlarging, Repairs and Orders for Apparatus are executed, as far as possible, the same day as received. Enquiries of any nature are gladly welcomed and all letters are replied to by return.

We are always pleased to give estimates for any new apparatus and to try and find any special second-hand camera, etc., that may be required and, if desired, build any special camera to customer's own specification.

STOCK - - - We hold the largest stock of fine quality apparatus by almost every known maker, including Newman & Guardia, Zeiss Ikon, Houghton-Butcher, Kodak, Thornton Pickard, Ross, Dallmeyer, Cooke, Bell & Howell, Victor, De Vry, Acme, etc., while we are in a position to obtain any special apparatus of English or foreign manufacture.

SECOND-HAND GOODS - - During the year we receive many very high-class outfits taken in part exchange for new goods, and we are always willing to sell these at a very small profit to avoid our stockrooms becoming too crowded. We believe that our prices are on the average considerably below those of any of our competitors, and a close comparison of second-hand lists will prove how correct we are in this belief.

Every second-hand article we sell is guaranteed to be as described and is subject to approval, in that we will take back any used apparatus and credit same in full (against other goods), within one month of purchase.

EXCHANGE - We make liberal allowances for cameras taken in exchange—giving you in almost every case the actual *saleable* value of your apparatus—which, in conjunction with our low prices, means that there is always less cash to be found when dealing with us.

DEFERRED PAYMENTS - We are pleased to supply any goods, new or second-hand, *in Great Britain* on easy payments. This entails the addition of a small percentage and payments can usually be arranged to suit your convenience. There are no embarrassing enquiries or harsh terms.

APPROVAL - Any goods may be had on five days' approval against full deposit, in Great Britain. This applies to post orders only.

TERMS - - - Net Cash. All cheques and postal orders to be crossed for payment through Midland Bank Ltd.

Monthly accounts may be opened on receipt of two satisfactory trade references.

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" The Amateur Ciné People."

SPECIAL NOTE TO CUSTOMERS ABROAD AND IN THE DOMINIONS.

FREE LISTS ARE SENT WILLINGLY ON REQUEST.

All orders to be addressed to—

WALLACE HEATON, LTD.,
Mail Order Department,
119, New Bond Street, London, W.1.

OUR NEW LIST - " The Zodel Book " contains all the most up-to-date and popular cameras, lenses and photographic apparatus.

OUR SECOND-HAND LIST - - - Is full of the goods actually in stock at the time of printing, but it is very difficult for a customer resident abroad to get his order to us in time to secure anything from this list as the goods, thanks to their low prices, sell exceedingly quickly in this country.
We suggest that you remit us the amount you wish to spend, giving us full particulars of the actual apparatus you require, with any alternatives possible. We are almost always able to secure for you the Camera you want at the price you want to pay, with little if any delay, and hundreds of satisfied customers vouch for our fair dealing when the choice of apparatus is left to us.

FOREIGN CUSTOMERS - Should note that our prices are net and not subject to any discount whatever, and it is not possible for us to consider offers of less than our advertised prices.
We always endeavour when executing orders for abroad to put ourselves in the customer's place, and to see that the apparatus chosen is *really* suitable in every way to our customer's requirements.
We are building up an enormous export trade on these lines and we do ask in all sincerity that customers abroad will give us the opportunity of showing how safe and satisfactory buying by post can be.

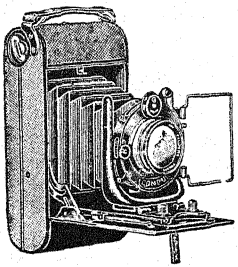
CATALOGUES Of the goods of all the leading makers—Zeiss, Goerz, Ross, Cooke, Thornton Pickard, Houghton Butcher, Bell & Howell, Victor, Kodak, etc.—always available, and forwarded on request.

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THE ROLL FILM PENTAC CAMERA.

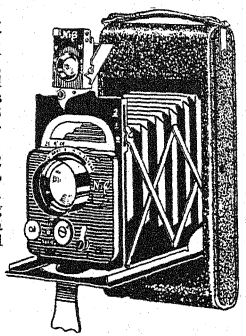


For pictures 3¼×2¼. Allows of instantaneous exposures indoors and in very bad light. Compur shutter is fitted and the "Pentac" is the only high-speed roll film camera made. The workmanship is of the best, and the Pentac lens may be relied on for the finest possible definition.
Price **£17/17/0**

THE SIBYL EXCELSIOR.

By Newman & Guardia. This is their latest and best model, and is fitted with a Ross Xpres f 4.5 lens and new shutter. Speeded 2 secs. to 1/150th sec. High rising front, and a patented film loading device.

Price
£32/10/0

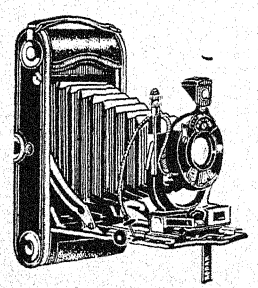


Your own camera can always be taken in exchange.

ROLL FILM CAMERAS.
In addition to those illustrated, we hold an unequalled stock of Roll Film Cameras. New and Second-hand, and are always pleased to advise in the choice of suitable apparatus.

Deferred payments arranged on specially reduced terms for 1929.

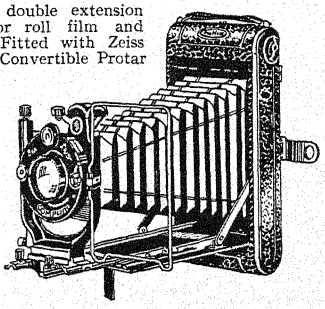
THE 3a SPECIAL "KODAK."



Fitted with rangefinder. Has always been the traveller's favourite, for sheer hard wearing qualities and reliability it is almost unapproachable. Price, with Compur shutter and Zeiss Tessar f 4.5 lens with all the usual movements—rising front, etc.—and Rangefinder.
Price **£18/10/0**

THE ZEISS IKON "NIXE."

The best double extension Camera for roll film and plates. Fitted with Zeiss Tessar or Convertible Protar lens in Compur shutter speeds from 1 sec. to 1/150The Nixe is also made in ¼ plate size.



Postcard size.
With f 4.5 Zeiss Tessar lens ... **£18/7/6**
With f 7.2 Zeiss Protar lens ... **£26/12/6**

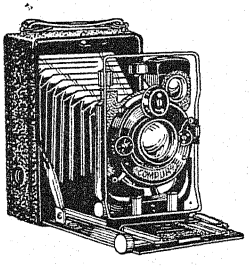
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THE "ZODEL DE LUXE."

The finest small plate and film pack camera ever designed for the serious worker.

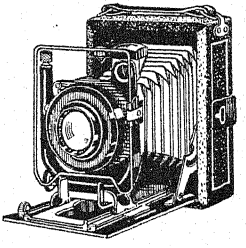


Made in 3½ × 2½ size. Has an all-metal body, rising and cross front, Compur shutter, double extension, etc., and is of the highest possible quality. Price with f 3.8 Anastigmat lens **£8/8/0**

Price with f 4.5 Convertible lens **£7/7/0**

THE "ZODEL REGULAR."

A camera for the worker who wants a really serviceable outfit. Slightly less expensive than the De Luxe Model.



Has a wooden body double extension and all the usual movements. F 4.8 Anastigmat lens, Il x shutter.

Price, 3½ × 2½ **£4/10/0**
Price, ¼-plate **£4/17/6**

We have hundreds of testimonials to "Zodel" value.

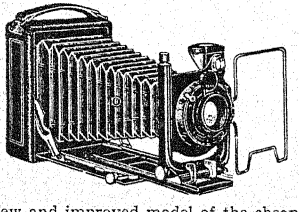
THE FOUR FAMOUS ZODEL CAMERAS.

The name "Zodel" has always meant "The World's finest value." Our 1929 models uphold this reputation.

"The Zodel is as good as any other at twice the price." K.W.M.

"THE ZODEL JUNIOR."

Our most popular model.

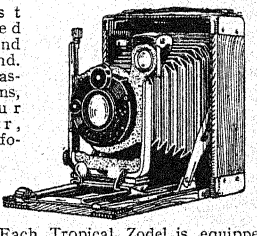


A new and improved model of the cheapest "Good" Camera in the world. Double extension—an f 6.3 anastigmat lens, speeded shutter and wire frame finder. Covered in the finest leather and fitted with rising and cross front.

Price, 3½ × 2½ **£2/17/6**
¼-plate **£3/ 3/0**

THE "ZODEL TROPICAL."

Offers the overseas worker similar unbeatable value.



Finest polished finish and brass bound. F 4.5 Anastigmat lens, Compur shutter, hooded focussing screen, rising and cross front. Each Tropical Zodel is equipped with 3 slides and is the cheapest "Tropical" model by any maker.

Price, 9 × 12 (and ¼-plate) size ... **£6/17/6**

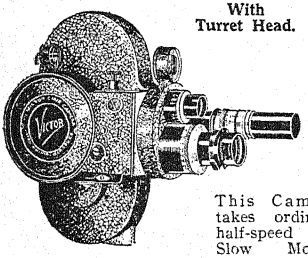
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THE NEW SUPER SPEED SLOW-MOTION VICTOR.

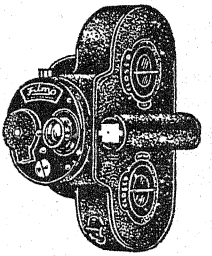
With Turret Head.



This Camera takes ordinary half-speed and Slow Motion pictures. It can also be worked by hand crank, if desired, and the *Turret Head* allows of any of three lenses to be used at will, without any delay.

Price, complete with f 3.5 Dallmeyer lens, **£50/0/0**

THE BELL & HOWELL "FILMO 70"



is the world's best spring drive—no focussing—runs 4½ minutes without reloading. Interchangeable lenses available. F 3.5 Cooke lens fitted as standard. Regular model works at 16 and 8 pictures per second, while special models for 32 and 128 pictures per second may be had.

Price **£54/0/0**

Every cine sundry always in stock or obtained at very short notice.

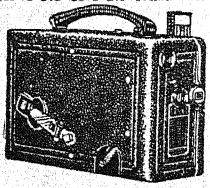
AUTOMATIC 16 mm. CINE CAMERAS.

Whatever you want for Cinematography—we have it. Since the earliest days we have always been known as "The Amateur Cine People."

A complete range of high-speed and telephoto lenses always available.

THE CINE KODAK.

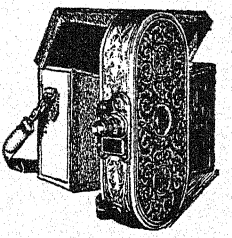
The "Popular" Cine Camera. Supplied with f 3.5 or f 1.9 lens. Requires no tripod and is always ready for immediate use. Daylight loading. Capacity 100 feet. Projectors for these cameras are illustrated on the following page.



Price, f 3.5 ... ... **£25/0/0**
Price, f 1.9 ... ... **£31/10/0**

BELL & HOWELL'S NEW "WATCH-THIN" FILMO 75.

The pocket Camera for 16 mm. film—automatic—small and light—perfect for the traveller & sportsman, or for ladies' use. With f 3.5 Cooke lens. Telephoto lenses readily interchangeable, 2X, 3X, and 4X always available.



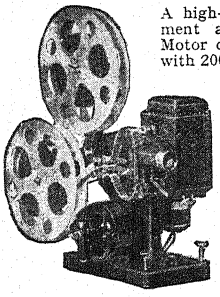
Price, in case **£30/0/0**

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THE DE VRY PROJECTOR.



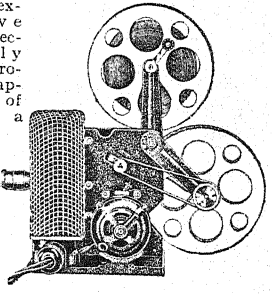
A high-powered instrument at a low price. Motor driven and fitted with 200 watt lamp.

This projector fills a long felt want, and may be had with 1½" or 2" Dallmeyer projection anastigmat lens as desired.

Price **£30/0/0**

"THE KODASCOPE C."

An inexpensive 16 mm. electrically driven projector capable of showing a well illuminated picture large enough for any home use "Still picture" & rapid rewind are fitted to this model.



Price **£18/0/0**

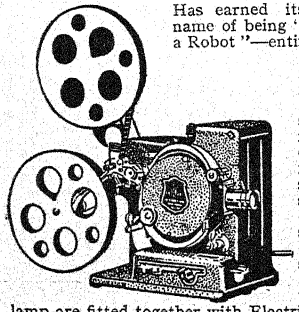
"Cine Kodagraph" films fit all these projectors — Many Subjects. Price **35/-** each.

16 mm. CINE FILM PROJECTORS.

The choice of a Projector is easy at 119 New Bond Street, where you may examine all the latest and best instruments, and receive the assistance of Specialists.

Films available for hire at any time. Particulars on request.

THE KODASCOPE MODEL "B."

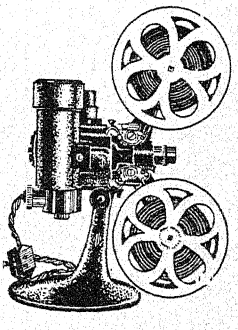


Has earned itself the name of being "Almost a Robot"—entirely self-threading — it is only necessary to insert end of film in slot and switch on. A special optical system and 200 watt lamp are fitted together with Electric drive, 110 volts, high speed, re-wind, reverse, etc.

Price, complete in case **£89/10/0**

THE NEW HIGH-POWER FILMO.

Gives the brightest pictures in the world, from 16 mm film. Gives reverse movement, etc., and absolutely free from flicker. Electric drive, 110 volts, and fitted with a voltmeter which allows the lamp to be always worked at its maximum safe limit.



Price, complete in case ... **£75/0/0**

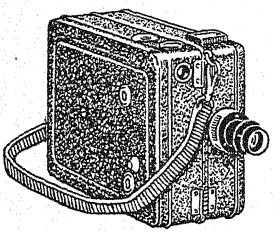
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THE "DE VRY AUTOMATIC."

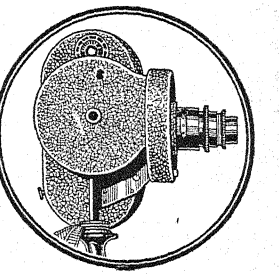
Provides the professional or advanced amateur with an automatic camera capable of exceedingly hard usage at a very moderate price—the De Vry can be hand driven at will and a variety of extra lenses for same can be obtained.



Price, with f 3.5 Dallmeyer lens, **£45/0/0**

THE BELL HOWELL EYEMO.

An automatic spring-driven camera, holding 100 feet daylight-loading film. F2.5 Cooke lens. No tripod needed. No cranking.



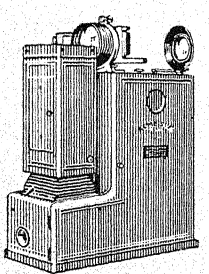
Weighs only 7 lbs. The finest portable in the world. Price **£82/10/0**
Hand drive fitted, if desired, £10 extra.

For the advanced worker, 35 mm. film offers greater possibilities than the smaller sizes

STANDARD SIZE CINEMA APPARATUS

For record work, expeditions, etc. Standard film is a necessity.

THE ACME PROJECTORS

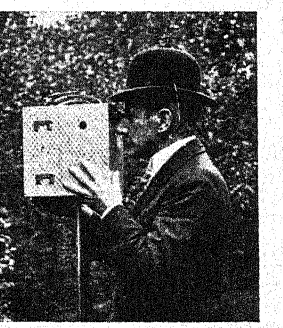


Are tried favourites—the No. 12 portable, with 400 watt lamp, is the travellers' choice—while for small theatre projection the S.V.E. model, with 100 watt lamp is generally selected. Both instruments have a film capacity of 1,000 feet and are electrically driven, while the S.V E model provides for the showing of lantern slides if desired

Price, No 12 **£75/0/0** S V E **£112/10/0**

THE "N.S. KINE."

Holding 200 feet film is the most perfect automatic Camera. Spring-driven it will run 190 feet at one winding Variable speed, interchangeable lenses etc, and many detail refinements ensure the selection of this instrument for accurate and important work



Price **£120/0/0**

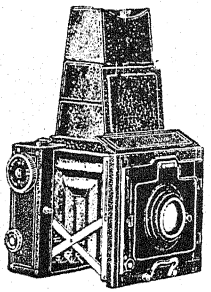
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"The Amateur Ciné People."

THE NEW ZEISS IKON "MIRAFLEX"

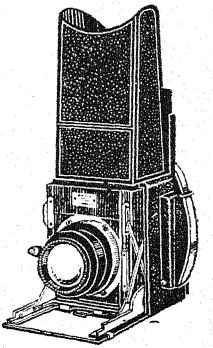
Small, light and ultra efficient, this new model marks a new era in Camera construction.



Made in 9×12 cm. size, this "Wonder Camer." may be either a focal plane "press," or a folding reflex at will. The shutter gives automatic speed from 1/3rd sec to 1/1300th sec., and lenses available are :—

Zeiss Tessar f 4.5 ... ... **£39/12/6**
Zeiss Tessar f 2.7 ... ... **£60/7/6**

THE NEWMAN & GUARDIA FOLDING REFLEX.



3½×2½, is the finest example of British reflex construction Hand-made throughout The "N & G" is of exceedingly rigid construction and very light in weight, and is favoured by Camera Connoisseurs throughout the world. The f 4.5 lens is rapid enough for most work, but if extreme speed is required the f 2.9 lens is to be recommended.

Price, with f 4.5 Ross Xpres lens, **£47/10/0**
Price, with f 2.9 Dallmeyer Pentac, **£56/0/0**

Our second-hand stock of reflex cameras by all the leading makers is unequalled.

REFLEX CAMERAS

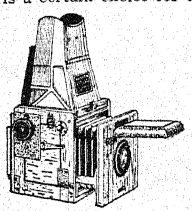
require selecting with due consideration to your requirements. If a suitable type is chosen there is no camera capable of doing better work for general "serious" photography.

We have specialized, and our knowledge and advice are at your disposal, gratis.

To complete your reflex—it needs a telephoto lens. We stock those made by Dallmeyer and Ross, etc.

THE NEW ENSIGN SPECIAL TROPICAL REFLEX

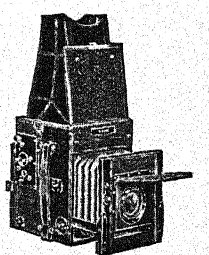
is a certain choice for the Overseas worker. Exceedingly light in weight, it is constructed of the finest teak and is bound in non-corroding metal. A self-capping shutter, extra light mirror movement, make this model a prime favourite in all climes.



3¼×2½, with Ross Xpres f 4.5 lens, **£22/0/0**
¼-Plate, with Ross Xpres f 4.5 lens, **£23/5/0**

THE SOHO

Has the enviable reputation of being the finest square form reflex camera. It is equipped with revolving back and the patented "Kershaw" mirror movement which is entirely free from "jar."



Price, 3¼×2½, Ross f 4.5 lens ... **£30/10/0**
Dallmeyer f 2.9 ... **£37/10/0**
Price, ¼-Plate, Ross f 4.5 lens ... **£32/0/0**
Dallmeyer f 2.9 ... **£38/10/0**

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The Automatic Camera.

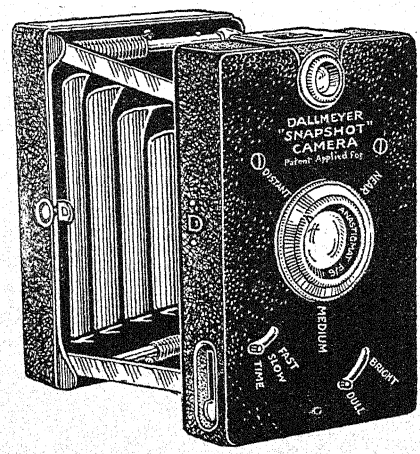
NOTHING TO LEARN.

THE DALLMEYER "SNAPSHOT" CAMERA.

NOTHING TO FORGET.

Patent No. 295071.

Takes any make of 3¼×2¼ (6×9 cm.) Film Pack, 6 or 12 exposure.



Price in Real Morocco Leather Case **5 Guineas.**

"A NOVEL CAMERA FOR SIMPLIFIED PHOTOGRAPHY."

The Dallmeyer Snapshot Camera is the latest production of the famous House of Dallmeyer. It is fitted with an entirely new design anastigmat lens, giving wonderful definition to the extreme corners of the film. The aperture f/6 allows pictures to be taken in "Dull" or "Bright" light. The Camera is small enough to go into the pocket, weighs but just over half-a-pound, and will give perfectly sharp and brilliant pictures in the hands of a beginner who has little, if any knowledge of photography. No apertures to worry about. No shutter speeds to calculate. No focussing scale to consider.
For the convenience of overseas readers, this Camera may be had engraved in any language, to order, without extra cost.
Made of metal throughout, finished chrystalline enamel. Write for Illustrated Booklet to:

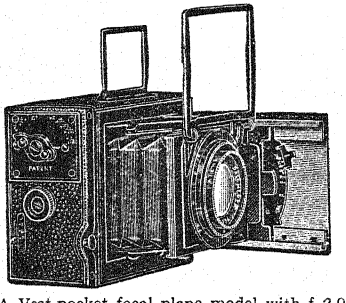
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VEST POCKET CAMERAS.

THE DALLMEYER SPEED CAMERA.



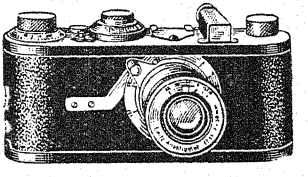
A Vest-pocket focal plane model with f 2.9 Pentac lens, capable of dealing with the most difficult subjects.

Price **£25/0/0**

$3\frac{1}{2} \times 2\frac{1}{2}$ **£32/0/0**

THE LEICA.

A roll film focal plane model, taking 36 pictures at one loading. Elmar f 3.5 Anastigmat lens. The pictures made with this Camera can easily be enlarged up to 10 × 8 or larger.



Price, with case and rangefinder **£20/5/0**

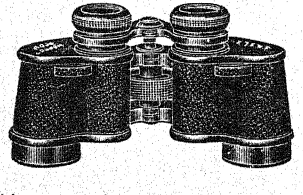
We have a good assortment of Microscopes in stock, second-hand.

If you live in England, we will supply you with any apparatus, New or Second-hand on the "Easiest of Easy Payments." Let us quote you.

Optical appliances, spectacles etc., in stock at 47 Berkeley St.

BINOCULARS OF MERIT.

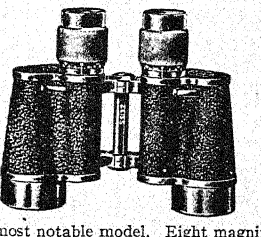
THE "NEW ROSS 7X" MODEL.



With central focussing, gives $9\frac{1}{2}$ degrees actual field, and is the smallest super-efficient glass for racing and tourist use.

Price, in tan case **£15/15/0**

THE ZEISS DELACTIS.



Their most notable model. Eight magnifications and 40 mm. object glass. Gives wonderful light transmission and a large field.

Price, in case **£16/10/0**

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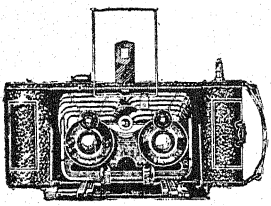
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STEREO CAMERAS.

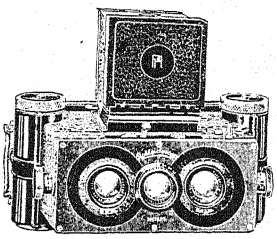
THE ZODEL STEREO

is the most popular collapsible Stereo Camera made, it uses the ordinary No. 2 Brownie film and can be used for 6×13 or 7×13 pictures.



Price, with f 4.5 lenses in Compur shutter, **£12/12/0**

THE ROLLEIDOSCOPE



is the latest roll film Stereo Camera, with reflex focussing, fitted with Zeiss f 4.5 lenses.
45×107—uses V.P.K. films ... **£30/15/0**
6×13—uses No. 2 Brownie films **£37/0/0**

Stereoscopy has recently enjoyed a "boom."—Have you taken it up?

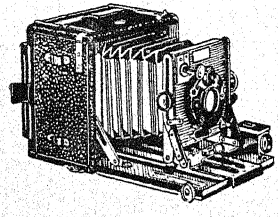
EXCHANGES

are our speciality. We will always take your own apparatus in part payment for new goods, and our allowances are always the highest possible.

We cater for the serious photographer as well as the snap-shotter.

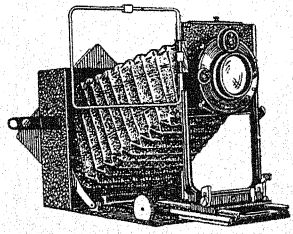
HAND AND STAND CAMERAS.

THE SANDERSON



is probably the best known Camera for the architectural photographer, and has an unbeatable range of movements, including triple extension. The latest model has revolving back, and is available with or without lens from **£13/15/0**

THE LINHOF



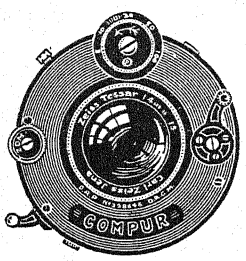
is a somewhat similar Camera. Made entirely of metal and has revolving back. Zeiss Tessar or Protar lenses are fitted, and with f 4.5 lens the Linhof costs—
3¼×2½ **£22/15/0**
¼-Plate **£25/10/0**

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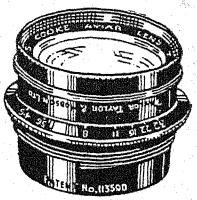
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THE ZEISS RANGE OF LENSES.



Tessar f 6.3 f 4.5, f 2.7 and Protar, etc., are probably better known than any others, and are to be found on apparatus of the highest possible class. The f 4.5 series (non-convertible) is the favourite with Press Photographers all over the world, and the new f 2.7 series bids fair to rival it in popularity—with Reflex Camera users.

THE TAYLOR HOBSON COOKE LENSES



are also particularly fine, and the f 3.5 and f.4 Telephoto lenses of this make, for cinematograph cameras are deservedly popular, as are also the f. 2 and f 1.5 series, permitting of instantaneous photography under the most adverse conditions. The mechanical finish of this maker's products is exceptionally good, and their extreme aperture lenses are among the best made.

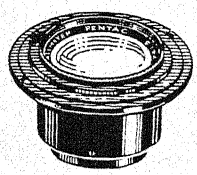
"Buying by post" is safe when you deal with Wallace Heaton, as all goods are guaranteed.

LENSES. By the World's Best Makers. We are special agents to all the principal manufacturers and can give you the benefit of our advice in the selection of suitable lenses and apparatus for every branch of photography.

EXCHANGES. We are at all times glad to quote you for exchanging your present apparatus, if it is submitted to us for valuation.

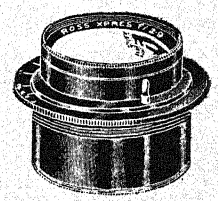
Our Mail Order business permits of 5 days' approval in the U.K., thus freeing you from all risk.

THE DALLMEYER PENTAC



working at f 2.9 keeps this maker well before the public. Although practically the earliest high-speed lens the Pentac, thanks to its wonderful flatness of field and definition, remains one of the most popular, and for reflex and focal plane cameras is to be strongly recommended.

THE LONDON MADE ROSS "XPRES"



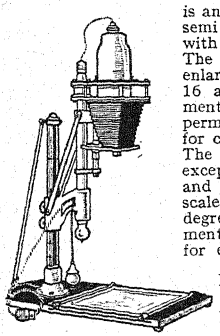
is a great favourite and boasts exceptional covering power and flatness of field. Its freedom from "flare" is also remarkable, and with the famous "Teleross" telephoto lens of the same factory provides an optical equipment for the reflex user that would be hard to beat.

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THE AUTOPRINT



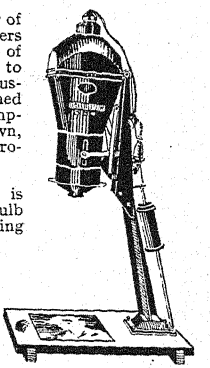
is an electric model, semi - automatic, with scale focussing. The ¼-plate model enlarges up to 20×16 and an attachment is available permitting of its use for copying, etc. The Autoprint is exceptionally rigid, and is accurately scaled in varying degrees of enlargement. Complete—for electric light.

Price, 3½×2½—**£9/15/0**

Price, ¼-Plate—**£13/15/0**

THE MIRAPHOT.

The most popular of all vertical enlargers—takes any size of film or plate up to 9×12 cm. Focussing is accomplished by moving the lamphouse up and down, and the image projected is always sharp.
The illumination is from a gas-filled bulb in a special diffusing lamphouse.



Price, with electric flex and Zeiss f 4.5 lens, **£11/7/6**

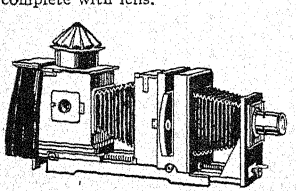
Zodel plates in all sizes—are the cheapest of all the good plates.

ENLARGERS.
Enlarging can make a "snap" into a "picture." Our specialists will undertake any special work of this nature, quickly and efficiently.

Walking stick tripods to fit all cameras. **18/6** each.

THE ZODEL No. 4 ENLARGER

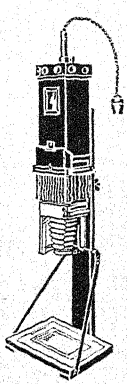
is a splendid "Overseas" Model. Finest teak throughout and a solid copper lamphouse. Central swinging stage, etc. Available for electric, gas or acetylene light.
The Zodel may be had with lens or adapted for use with any camera. The prices below are complete with lens.



3½×2½	...	...	...	**£9/1/6**
¼-Plate	...	...	...	**£10/0/0**

THE ZODEL JUNIOR VERTICAL MODEL

provides an enlarger in its simplest and cheapest form—without any sacrifice in utility. This model may be had also for use with any folding camera, and fitted for gas or electric light. The lamphouse is very high, thus overcoming overheating troubles, and the enlarger is to be thoroughly recommended.



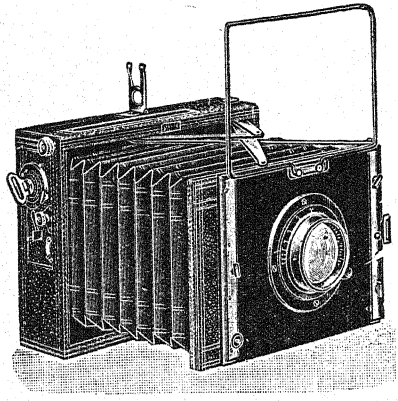
Prices from ... **£2/5/0**

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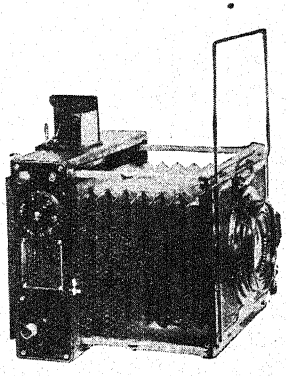
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PRESS CAMERAS.



THE ZEISS IKON NETTEL,

with the wonderful focal plane shutter, speeded from 1/3rd sec. to 1/1300th sec., in which provision is made for back focussing independent of shutter adjustment.
Price, with f 4.5 Tessar lens—
9×12 cm. (¼-Plate)... ... **£30/7/6**



THE ZODEL FLEET

9×12 cm. A new metal model embodying the sweetest, quietest, self-capping focal plane shutter in existence. Quick focussing adjustment is provided, 6 single slides and f 3.5 Anastigmat lens.
Price **£18/18/0**

"ZODEL" ACCESSORIES, &c.

We carry one of the finest stocks in London, and everything sold carries our guarantee.

ZODEL Supplementary Lens Sets, in spring holder, comprising wide-angle, telephoto, portrait, copying, etc., and colour filter. To fit 1¼" lens, **12/9**; 1½" lens, **13/6**; 2" lens **18/9** per set.

ZODEL Self Timer. Beautifully nickelled, gives 20 seconds for user to get into position. Gives instantaneous and time exposures, from ½ to 10 seconds. Price **10/6**
Cheaper pattern for instantaneous only. Price **5/9** each.

ZODEL Developing Tanks. Of non-corrosive metal, nickel-plated, light trapped filler and bottom outlet. Can be used for fixing and washing. For 12 films or plates. Vest Pocket, **21/-**; 3½×2½, **24/-**; ¼-plate, **25/-**

The Justaphot Exposure Meter. The most accurate and scientific meter ever invented. Suits any camera or subject. Price **24/6**

ZODEL Filter Sets. Consisting of 4 screens, 1½—3—6× and graduated sky screen in spring clip holder. To fit lenses up to 1¼", **6/6**; 1½", **7/6** per set.

ZODEL Exposure Calculator. The simplest of them all, and exceedingly accurate. Only one moving scale. Price **9d.** (post. 2d.).

ZODEL Focussing Magnifier. Adheres to the focussing screen, 2¾" long. Price **6/6** each.

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SECOND-HAND CAMERAS.

WE believe our stock of Second-hand Cameras, taken in part exchange from our customers in the West End when purchasing new goods, to be the finest collection of used apparatus in the country. Every Camera, etc., is carefully overhauled and is guaranteed to be in perfect working order. In many cases the apparatus is "as new," and the prices generally are from one-third to half the original cost.

We can supply any goods for cash or on easy payments (in Great Britain), without any harsh conditions or embarrassing enquiries.

We take in exchange Cameras, Lenses, Binoculars, Microscopes, Jewellery, Antiques, etc. Any second-hand apparatus sent on five days' approval against full deposit—by post. Any special model required, second-hand, can usually be obtained within a few days.

	£	s.	d.
1—**3a Graflex R.F. Camera,** Zeiss Tessar f/4.5 lens, and leather case. Cost £32 ... ... Price	13	10	0
2—**¼-Plate Auto Graflex,** Buasch & Lomb Tessar f/4.5 lens, roll holder and leather case. Cost £23 ... ... Price	7	15	0
3—**10×15 Mentor Folding Reflex Camera,** Zeiss Tessar f/4.5 lens, 3 double slides and F.P.A. Cost £45 ... ... Price	15	15	0
4—**9×12 cm. Folding Plate Camera,** double extension, Krauss Tessar f/4.5 lens, Compur shutter and 12 slides. Cost £17 10s. ... ... Price	6	6	0
5—**9×12 cm. Ica Minimum Palmos Focal Plane Camera,** Pentac f/2.9 lens, 6 double slides, F.P.A. and leather case. Cost £35 ... ... Price	19	19	0
6—**Three-Speed Filmo Cine Camera,** Cooke f/3.5 lens and leather case. Cost £62 ... ... Price	47	10	0
7—**Baby Pathe Cine Camera,** Trianar f/3.5 lens and leather case. Cost £5/10 Price	2	19	6
8—**Model B Cine Kodak,** f/3.5 lens and leather case. Cost £26/10 ... Price	17	17	0
9—**Ica Kinamo Cine Camera** for Stsndard film, Dominar anastigmat f/3.5 lens, 3 spool boxes and leather case. Cost 37/10 ... ... Price	27	10	0
10—**9×12 cm. Folding Plate Triple Extension Tropex Camera,** Dallmeyer f/6 stigmatic lens, compound shutter, 5 slides, F.P.A. and leather case. Cost £25 ... ... Price	4	4	0
11—**5×4 Marion Soho Reflex,** Zeiss Tessar f/4.5 lens, revolving back, 4 double bookform slides, camera sling and canvas case. Cost £40 ... Price	19	19	0
12—**Bell & Howell Filmo Camera,** Cooke f/3.5 lens and leather case. Cost £58 ... ... Price	42	10	0
13—**3½×2½ Dainty Soho Reflex,** Pent c f/2.9 lens, McKenzie Wishart Adapter and 12 envelopes and leather case. Cost £42 ... ... Price	26	10	0
14—**T.P. Ruby Cine Camera,** Dallmeyer f/1.9 lens and leather case. Cost £37/10 ... ... Price	16	16	0
15—**¼-Plate T.P. Reflex Camera,** revolving back, Cooke anastigmat f/2.5 lens, also Cooke tele-anastigmat 12½" Series VII lens, F.P.A., 2 double slides and leather case. Cost £60 ... ... Price	42	10	0
16—**9×12 Ernemann Long Extension Folding Reflex,** Zeiss Tessar f/4.5 lens, T.P. shutter, F.P.A. and 3 double dark slides. Cost £50 ... ... Price	25	0	0
17—**¼-Plate T.P. Reflex,** Ross Tessar f/4.5 lens, reversing back, changing box and leather case, also Voigtlander Telenegative lens. Cost £25 ... Price	6	17	6
18—**1a Roll Film Graflex,** Zeiss Tessar f/4.5 lens. Cost £28 ... ... Price	12	12	0
19—**10×15 cm. Goerz Tenax Folding Plate Camera,** Goerz Dogmar f/4.5 lens, Compur shutter, double extension, 3 single slides in wallet, F.P.A. and leather case. Cost £18 ... ... Price	7	17	6

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BIRMINGHAM

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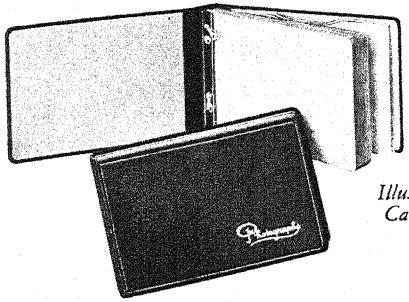
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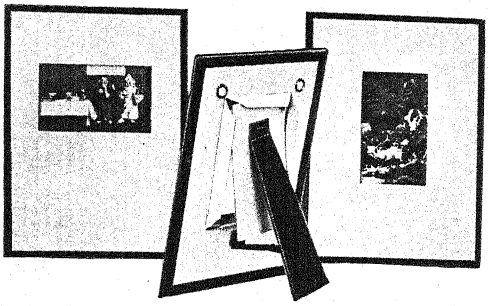
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SIMPLICO

QUADRO FRAMES



The "SIMPLICO" is an adaptation of the famous "Quadro" Frame, and provides a simple and artistic method of framing photographs and pictures. Fitted with a neat cut-out mount, the large margins effectively display the picture inserted. Supplied in eight sizes: Vest Pocket to 1/1 plate, in two colours. *Particulars and prices upon request.*

STANDARD QUADRO FRAMES

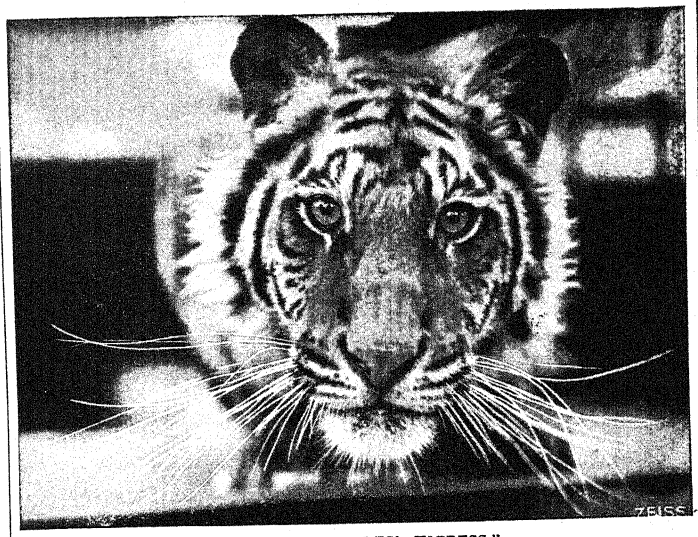
Made in a great variety of sizes, varying from 4" × 2¾" to 16½" × 12½", in Black, Brown, Grey, Gilt. *Price list upon request.*

Patentees & Manufacturers

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Obtainable from the Leading Photographic Dealers & Stores

CARL ZEISS
JENA



"PRINCE OF WALES' TIGRESS."
Taken with ZEISS F/4.5 TESSAR.

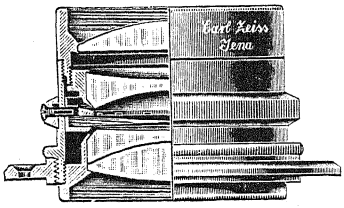
ZEISS
PHOTOGRAPHIC LENSES

British Representatives: CARL ZEISS (LONDON) LTD.,
Winsley House, Wells Street, Oxford Street, London, W. 1

ZEISS AGENTS:—

NEW YORK: Carl Zeiss, Inc., 485 Fifth Avenue. MONTREAL: The Hughes Owens Co., Ltd., 247 Notre Dame Street, W., also at Ottawa, Toronto, Winnipeg, Vancouver. CALCUTTA: Adair, Dutt & Co., Ltd., 5 Dalhousie Square, East. MELBOURNE: E. C. Heyne Pty., Ltd., Union Building, 100 Flinders Street, also at Sydney. CAPE TOWN: B. Owen Jones, Ltd., 38 Strand Street; and at PARIS, MILAN, MADRID, RIO DE JANEIRO, SHANGHAI, TOKIO, etc.

CARL ZEISS
JENA



TESSARS

F/4·5 *and* F/6·3

RAPID UNIVERSAL TESSARS F/3·5

THE Tessars F/4.5 and F/6.3 need no introduction as the premier rapid anastigmats for the highest quality work—Press, portrait or colour. The latest innovation is the Tessar F/3.5 for hand cameras, shown in heavy type below. These lenses are in every way the finest ultra rapid universal hand camera lenses yet produced. Attention is also drawn to the F/3.5 Tessars of longer focus which, with the F/2.7 Tessars (see p. 610) are unequalled for portraiture.

Focal Length. cm.	Focal Length. in.	Plate Size for which recommended. in.	Price. In Standard "N" Mount. £	s.	d.	In Sunk "B" Mount. £	s.	d.	In Focussing "A" Mount. £	s.	d.	With "Compur" or "Compound" Shutter. £	s.	d.
			TESSAR F/3.5.											
3.5	1⅜	¾×½	6	5	0		—		8	5	0		—	
4	1½	1×¾	6	5	0		—		8	5	0		—	
5	2	1×¾	6	5	0	6	15	0	8	5	0		—	
7.5	3	1¼×1⅛	7	5	0	7	15	0	9	5	0		—	
10.5	4⅛	3¼×2½	9	5	0	9	15	0	11	10	0	10	15	0
12	4¾	4¼×2½	10	0	0	10	10	0	12	5	0	12	0	0
13.5	5¼	4¼×3¼	10	15	0	11	10	0	13	15	0	13	10	0
15	6	5 ×4	12	5	0	13	0	0	15	5	0	15	0	0
16.5	6½	5½×3½	14	5	0	15	5	0	18	5	0	16	10	0
21	8¼	7 ×5	23	0	0		—		29	0	0		—	
25	10	5 ×4	29	5	0		—		37	0	0		—	
30	12	6½×4¾	37	0	0		—			—			—	

In course of preparation: Tessars F/3.5 7 cm. and 8 cm. focus.

			TESSAR F/4.5.											
4	1½	1¼×1⅛	5	0	0		—		7	0	0		—	
5.5	2¼	1⅝×1¾	5	0	0	5	10	0	7	0	0	6	5	0
6.5	2½	2×1¾	5	0	0	5	10	0	7	0	0	6	5	0
7.5	3	2⅜×1¾	5	0	0	5	10	0	7	0	0	6	5	0
9.0	3½	3¼×2½	5	0	0	5	10	0	7	0	0	6	5	0
10.5	4	3¼×2½	5	0	0	5	10	0	7	0	0	6	5	0
12	4¾	3¼×2½	5	10	0	6	0	0	7	10	0	6	15	0
13.5	5¼	4¼×3¼	5	15	0	6	5	0	8	0	0	7	5	0
15	6	5×4	6	10	0	7	0	0	8	15	0	8	10	0
16.5	6½	5¼×3½	8	0	0	8	15	0	11	0	0	10	15	0
18	7	6½×4¾	10	10	0	11	5	0	13	10	0	13	5	0
21	8¼	7½×5	15	10	0	16	10	0	19	10	0	18	0	0
25	10	8×5	21	5	0	22	5	0	27	5	0	24	0	0
30	12	8¼×6½	30	15	0	32	10	0	38	10	0	34	15	0
36	14	9×7	40	10	0		—			—			—	
40	16	10×8	50	0	0		—			—			—	
50	20	12×10	77	0	0		—			—			—	

Particulars of Tessar F/6.3 on application.

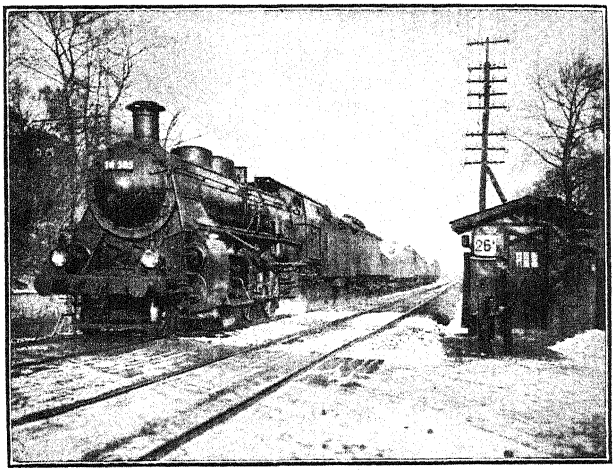
CARL ZEISS
JENA

Taken with ZEISS F/4.5 TESSAR

CARL ZEISS
JENA

TESSAR F/2.7 & TRIOTAR F/3 & F/3.5

EXTRA RAPID



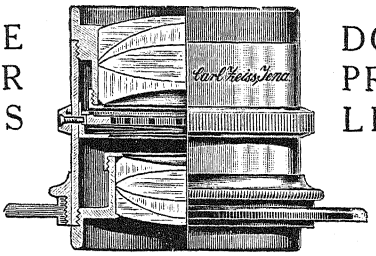
Photograph taken in January with a ZEISS TESSAR F/3.5; focus 13.5 cm. Exposure 1/500 second.

Focal Length.		Plate Size for which recommended, in.	Tessar F/2.7						Triotar F/3 and F/3.5					
			In Standard "N" Mount.			In Focussing "A" Mount.			In Standard "N" Mount.			In Focussing "A" Mount.		
cm.	in.		£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1.5	$\frac{5}{8}$	Small cine. e.g. $\frac{3}{4} \times \frac{1}{4}$	9	5	0		—		4	15	0	6	15	0
2	$\frac{3}{4}$		7	15	0		—		4	0	0		—	
2.5	1		7	15	0	9	15	0	4	0	0	6	0	0
3.5	$1\frac{3}{8}$	Standard cine. $1 \times \frac{3}{4}$	7	15	0	9	15	0	4	0	0	6	0	0
4	$1\frac{1}{2}$		7	15	0	9	15	0	4	0	0	6	0	0
5	2		8	10	0	10	10	0	4	5	0	6	5	0
7.5	3	$2\frac{3}{8} \times 1\frac{3}{4}$		—			—		5	0	0	7	0	0
8	$3\frac{1}{4}$		10	0	0	12	0	0		—			—	
10	4	$2\frac{3}{8} \times 2\frac{3}{8}$	12	10	0	14	15	0	6	5	0	8	5	0
12	$4\frac{3}{4}$	$3\frac{1}{4} \times 2\frac{3}{8}$	14	0	0	17	0	0	7	0	0	9	5	0
14.5	$5\frac{3}{4}$	$3\frac{1}{4} \times 2\frac{1}{4}$	16	10	0	20	10	0		—			—	
15	6	$4\frac{1}{4} \times 3\frac{1}{4}$ / 5×4		—			—		9	0	0	12	0	0
16.5	$6\frac{1}{2}$	5×4	20	0	0	26	0	0		—			—	
18	7	$5\frac{1}{4} \times 3\frac{1}{4}$		—			—		11	10	0	15	10	0
21	$8\frac{1}{4}$	$6\frac{1}{2} \times 4\frac{3}{4}$		—			—		15	0	0	21	0	0

Particulars of these Lenses in sunk "B" mount or with "Comp." shutter on application. Write for Pamphlet P258.

CARL ZEISS
JENA

SINGLE PROTAR LENSES F/12.5



DOUBLE PROTAR LENSES F/6.3 F/7.7

THE PERFECT CONVERTIBLE

THE Double Protar is a universal Lens in every sense of the word, and is in this respect unapproached by any other lens.

Focal Length cm.	Focal Length in.	Plate Size for which recommended in.	Price. In Standard "N" Mount. £ s. d.	In Sunk "B" Mount. £ s. d.	In Focussing "A" Mount. £ s. d.	With "Compur" or "Compound" Shutter. £ s. d.
PROTAR LENS F/12.5.						
18	7	6½×4¾	**6 5 0**	—	*4 15 0	**8 0 0**
29	11½	8½×6½	**7 15 0**	—	**6 5 0**	**9 15 0**
35	14	10×8	**9 5 0**	—	**7 15 0**	**11 15 0**
DOUBLE PROTAR F/6.3—7.7						
In.						
7/7	4	3½×2½	**11 0 0**	—	—	**12 15 0**
8¾/8¾	5	4½×3¼	**11 10 0**	—	—	**13 5 0**
11½/11½	6¾	6½×4¾	**14 0 0**	—	—	**16 0 0**
16/16	9½	8½×6½	**23 10 0**	—	—	**26 15 0**

PROTAR F/18.

The Protars F/18 embrace a very wide angular field, varying from 97° to 110°, which renders them particularly valuable for photographing buildings, interiors, machinery, etc.

Focal Length. cm.	Focal Length. in.	Plate Size for which recommended. in.	In Standard "N" Mount. £ s. d.
8.5	3¼	4¼×3¼	**5 0 0**
11	4½	6½×4¾	**5 10 0**
18	7	8½×6½	**7 5 0**

* Without tube.

Full Detailed List on Application.

CARL ZEISS
JENA



ZEISS DISTAR and PROXAR LENSES

For Supplementary use with TESSARS

DISTAR Lenses are simple weak negative lenses, which placed before the objective **increase** its focal length up to twice its normal value.

PROXAR Lenses are simple positive attachment lenses which **shorten** the focal length of the objective. Thus PROXAR Lenses make possible on the one hand close-up pictures on a large scale; on the other hand they enable a wider angle to be included on the plate than the objective alone would permit. DISTAR and PROXAR Lenses therefore widen considerably the scope of the ordinary focus camera lens, giving excellent results in combination with the ZEISS TESSAR. (See illustrations opposite.)

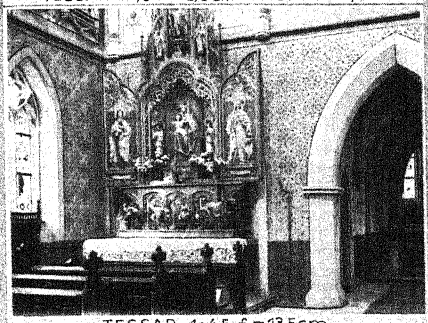
DISTAR Lens.	PROXAR Lens.	Available for use with Photo Lens.	Zeiss Tube.	Shutter Size.	PRICE. £ s. d.
2/Co	0.5/Co	Tessar F/4.5, f= 9 cm.=3½ in.	I	0/I	0 16 0
3/Co	1/Co	,, F/6.3, f=12 cm.=4¾ in.	I	0/I	0 16 0
3.5/Co	1.5/Co	,, F/6.3, f=13.5 cm.=5¼ in.	—	0	0 16 0
	2/Co				0 16 0
2/Co*	0.5/Co*	Tessar F/4.5, f=10.5 cm.=4¼ in.	—	0/I	0 16 0
3/Co*	1/Co*	,, F/6.3, f=15 cm.=6 in.	—	0	0 16 0
3.5/Co*	1.5/Co*				0 16 0
	2/Co*				0 16 0
2.5/Coa	0.5/Coa	Tessar F/4.5, f=12 cm.=4¾ in.	—	0a	0 16 0
3.5/Coa	1/Coa				0 16 0
4.5/Coa	1.5/Coa				0 16 0
	2/Coa				0 16 0
1.5/II	0.5/II	Tessar F/4.5, f=10.5 cm.=4¼ in.	II	—	0 16 0
	1/II	,, F/4.5, f=12 cm.=4¾ in.	II	—	0 16 0
2.5/II	1.5/II	,, F/6.3, f=13.5 cm.=5¼ in.	II	—	0 16 0
3/II	2/II	,, F/6.3, f=15 cm.=6 in.	II	—	0 16 0
		,, F/6.3, f=16.5 cm.=6½ in.	—	I	
1.5/III	0.5/III	Tessar F/4.5, f=13.5 cm.=5¼ in.	—	1/III	0 16 0
2/III	1/III	,, F/6.3, f=16.5 cm.=6½ in.	III	—	0 16 0
3/III	1.5/III				0 16 0
3.5/III	2/III				0 16 0
1.5/IV	0.5/IV	Tessar F/4.5, f=13.5 cm.=5¼ in.	IV	—	0 16 0
2/IV	1/IV	,, F/4.5, f=15 cm.=6 in.	IV	2	0 16 0
2.5/IV	1.5/IV	,, F/6.3, f=18 cm.=7⅛ in.	IV	2	0 16 0
3/IV	2/IV	,, F/6.3, f=21 cm.=8⅜ in.	IV	2	0 16 0
3.5/IV					0 16 0
1/VI		Tessar F/4.5, f=16.5 cm.=6½ in.	VI	2a	0 19 0
1.5/VI	0.5/VI	,, F/4.5, f=18 cm.=7⅛ in.	VI	2a	0 19 0
2/VI	1/VI				0 19 0
2.5/VI	1.5/VI				0 19 0
3/VI					0 19 0
1/VII		Tessar F/4.5, f=21 cm.=8⅜ in.	VII	3	1 10 0
1.5/VII	0.5/VII				1 10 0
2/VII	1/VII				1 10 0
2.5/VII					1 10 0

Particulars and Prices of other combinations on application.

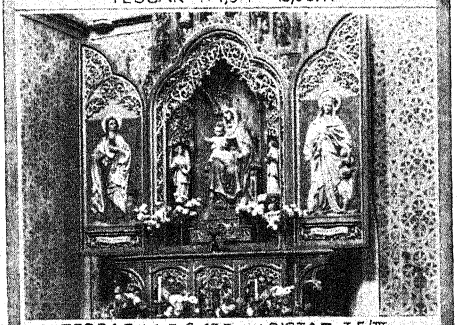
CARL ZEISS
JENA



TESSAR 1:4,5 f=13,5cm+PROXAR 2/III



TESSAR 1:4,5 f=13,5cm



TESSAR 1:4,5 f=13,5cm+DISTAR 3,5/III

BY the addition of a supplementary set of PROXAR and DISTAR Lenses you may convert **YOUR TESSAR** into a very elastic set, and be able to choose from many renderings of your subject *from the same standpoint* as indicated in this photograph.

The PROXAR Lens gives SHORTER focal lengths and a correspondingly WIDE ANGLE. The DISTAR Lens gives LONGER focal lengths and correspondingly LARGER SCALE PICTURES.

These photographs of the Weimar Church Altar illustrate the comparative fields of view embraced by the Tessar F/4.5, 13.5 cm. focus, used alone and in combination with the Distar and Proxar Lenses.

Write for Lists P 261 and P 246

CARL ZEISS
JENA

ZEISS BIOTAR
F/1.4
CINEMA ANASTIGMAT

THE BIOTAR is a new series designed for standard and narrow film cameras. It is the **most rapid lens** so far produced, and is **superior at any aperture to any other lens at the same aperture.**

The angular field of the BIOTAR is about 42°, standard film being well covered by the 4 cm. lens and narrow film (12.8 mm. diagonal) by the 1.7 cm. lens.

		£ s. d.
FOR STANDARD FILM.		
Biotar F/1.4.	4 cm. focus ... Price	15 10 0
,, ,,	5 cm. focus ... ,,	17 10 0
FOR NARROW FILM.		
Biotar F/1.4.	2.5 cm. focus ... Price	11 15 0
,, ,,	1.7 cm. focus ... ,,	11 15 0

A lens of 2 cm. focal length is, with others, in course of preparation.

ZEISS TELE-TESSAR
F/6.3

RAPID TELE-PHOTOGRAPHIC LENS.

The Tele-Tessar produces sharply defined pictures at full aperture with full illumination to the extreme edge of the field.

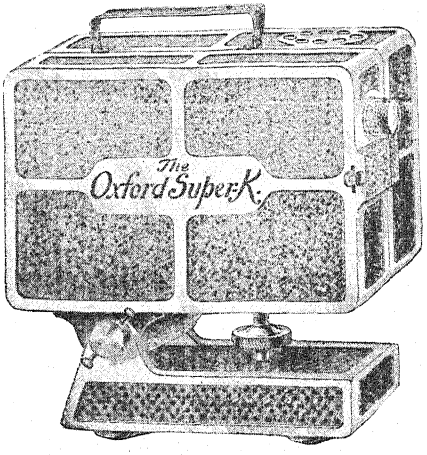
It is invaluable to sports and Press photographers, and places in the hands of Portrait and Landscape photographers a means of improving perspective without loss of speed or definition.

Focal Length.		Recommended for Plate Sizes.		PRICE.			
				In Standard "N" Mount.	In sunk "B" Mount.	In focussing "A" Mount.	With "Compur" or "Compound" Shutter.
cm.	in.	cm.	in.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
12	4¾	6×4½	2⅝×1¾	10 15 0	11 5 0	12 15 0	13 5 0
18	7	9×6	3½×2½	12 5 0	12 15 0	14 5 0	14 10 0
25	10	12×9	4¾×3½	15 10 0	16 0 0	17 15 0	18 5 0
32	12¾	15×10	6¼×4¾	20 0 0	20 15 0	23 0 0	23 5 0
40	16	18×14	7½×5	26 5 0	27 5 0	—	29 5 0

The OXFORD SUPER K

16mm. Home Projector

The Oxford *Folding Stand*



The Oxford *Home Cine Screens*

Is the only 16mm. Projector in which the film is completely cut off from the lamp, motor, etc., by a fireproof partition, and it is the only machine which is totally enclosed.

Is portable and the only model which is ready for use at a moment's notice. It will give from 15 to 20 minutes' show without preparation.

Is the only machine which dispenses with separate resistances at high voltages being available for all voltages from 100 to 250.

Is the only machine which will operate torn or damaged film. The intermittent principle employed is independent of the perforations.

Is the only machine which is completely safe from all fire risks.

These points are inherent in the design of the machine, and are covered by two patents (provisional) and the registered design.

LOVELESS & HUNTER

260 TOTTENHAM COURT ROAD, LONDON, W.1

'PHONE: MUSEUM 0694.

Four Features Exclusive to the Unique



16mm PROJECTOR

Safety.—The whole of the film in use is totally enclosed on one side of a partition inside the projector. This partition entirely separates the film from the illuminant and motor, so *there is no danger whatever of fire.* To render safety doubly sure there is a specially-constructed air-cooling device and an automatic switch which cuts off the light immediately the motor stops. There are no loose parts, and the resistance which is fitted in the base of the stand is also cooled by forced draught, so that it is impossible for the projector to become overheated. Every possible objection and source of danger has been foreseen and overcome in the OXFORD-SUPER-K. In addition to all this, the 16mm. film at present available is non-inflammable.

Accessibility.—While being completely enclosed in one outer case, every unit can be easily removed for cleaning or replacing if necessary. No part is so locked away that unnecessary difficulty and lacerated fingers are experienced in getting at it.

Portability.—Since the film spools are enclosed in the casing there is no need to remove these when packing, so that the complete requirements for showing the pictures can be carried in one case.

Standard Parts.—All parts of the OXFORD-SUPER-K Projectors are standard, and any parts becoming damaged in any way can be replaced with ease. Duplicates are guaranteed to fit and function as efficiently as those originally supplied.

PRICE, complete with Dallmeyer f/1.8 Projection Lens, 1½in. focus - - - - £45 0 0

NOTE.

THE OXFORD-SUPER-K has behind its construction years of experience of acknowledged experts in the cinematograph engineering world. The enormous advance it represents and the exclusive features it possesses are the result of this experience. It is British made throughout.

WRITE FOR BOOKLET.

General Equipment *of the*

OXFORD SUPER K

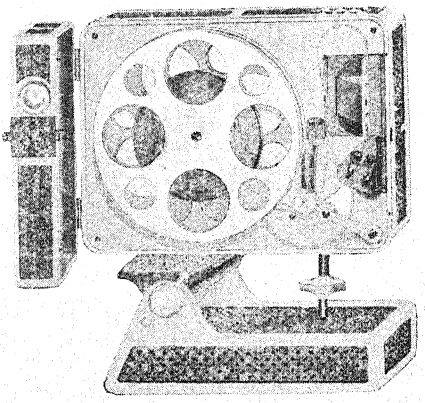
16mm PROJECTOR

The optical equipment consists of a Dallmeyer projection lens f/1.8 having a 1½in. focus and a Dallmeyer condenser specially constructed and matched so as to give the maximum illumination.

There is a brilliant projection lamp fitted that will provide a picture of perfectly even illumination about eight feet wide by six feet deep on a screen about 20 feet from the apparatus.

Each film spool holds sufficient of the 16mm. film to give a continuous show of sixteen minutes' duration. This is equivalent to the capacity of the spools on the professional size machines.

In every home where there is electric light the OXFORD-SUPER-K projector can be installed. It can be run off any current from 100 to 250 volts by adjusting the variable resistance incorporated in the base.



Interior view of the O-S-K-Projector, showing its simple construction.

LOVELESS & HUNTER

260 TOTTENHAM COURT ROAD, LONDON, W.1

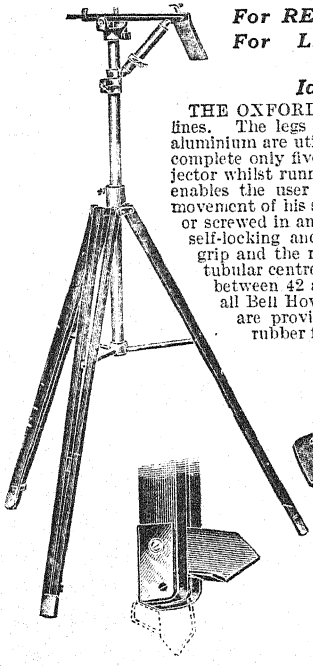
'PHONE: MUSEUM 0694.

The OXFORD Folding Stand

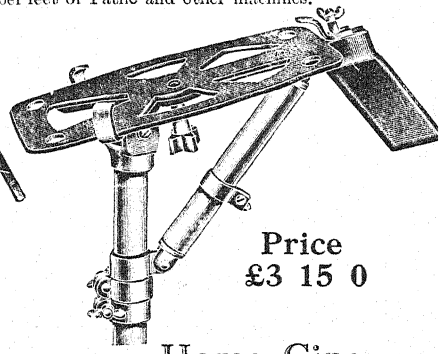
(Patent applied for)

For REFLEX and other heavy Cameras. For LIGHT PROJECTORS, CINE CAMERAS, etc.

Ideal for Home Portraiture.



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The finest home cine screens made, perfect in surface and texture, complete with polished top and bottom rollers.

No.	Size (ins.)	White	Silver	Stretchers extra
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103	32 × 24	11/6	14/-	4/6
104	39 × 29	14/6	18/6	4/6
106	51 × 39	26/-	32/6	4/6
108	63 × 48	48/9	51/-	—
110	72 × 59	62/6	62/6	—
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113	103 × 79	102/6	102/6	—

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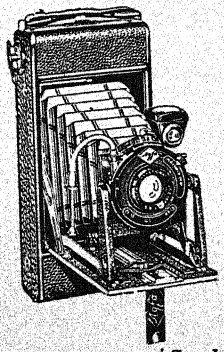
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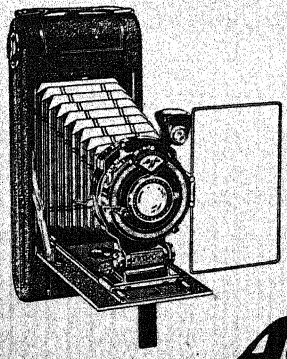
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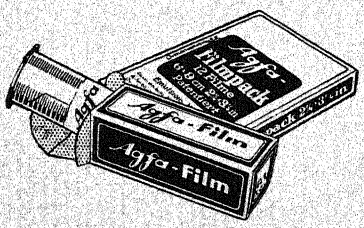
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UNDOUBTEDLY the most popular films with photographers of all classes. They provide more beautiful lights and shades—more natural pictures—exquisite in tone and detail. Their great speed and extra-sensitiveness ensure perfect photographs at any time of the day—early or late, and even if it's raining or if it's dull.

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The metal case protects the film from pressure and keeps it flat. Enables single films to be withdrawn for development.

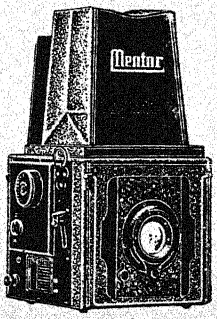
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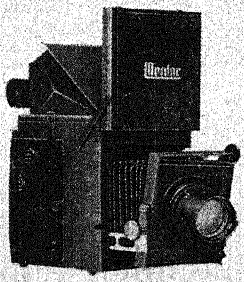
THE MENTOR REFLEX MODEL 1927

is fitted with Eye-level finder, has rising, falling and cross movements, focusing by lens mount and the latest Mentor Self-Capping Shutter for time, bulb and instantaneous exposures.

PRICES (including Zeiss Lens, 3 Metal Slides, Cable Release and Strap).

Size. Inch.	Size. Cm.	With Zeiss Tessar F/4.5. Camera No.	Lens Focus.	£ s. d.	With Zeiss Tessar F/2.7. Camera No	Lens Focus.	£ s. d.
2½×3½	6½× 9	281	4¼ in.	20 0 0	0281	4¾ in.	30 0 0
3¼×4¼	8 ×10.5	282	5¼ in.	22 0 0	0282	5¾ in.	39 0 0
—	9 ×12	283	5½ in.	22 0 0	0283	6½ in.	39 0 0

Metal Film Pack Adapter, Bag, etc., etc., extra.



MENTOR STUDIO REFLEX CAMERA

Special Features Include:

Two-fold Lens Movement, permitting of considerable selective focusing. Additional mirror and hood—subject can be viewed and focused at eye-level. Mentor Self-Capping. Adjustable Focusing Screen.

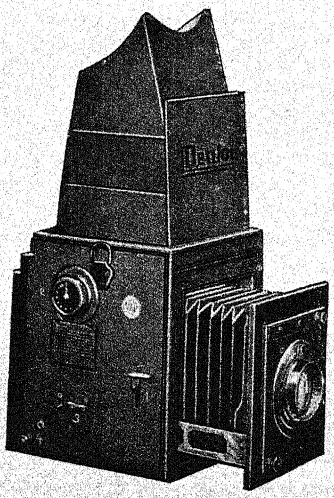
PRICES:

Size.		Price Without Lens.	£ s. d.
7 × 5	Two Models.	With extension from about 10 to 18 in.	130 0 0
		,, ,, ,, 12 ,, 21½ in.	150 0 0

Prices include 3 Double-plate Holders, Flexible Metal Release, and carrying straps

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Reversible Back,
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Extreme Durability.

Cheaper and Smaller Model supplied without reversing back.

PRICES (including Zeiss Tessar F/4.5, 3 double dark Slides, Cable Release and Strap):

With Reversing Back.					Without Reversing Back.		
Camera. No.	Size. Inch.	Size. Cm.	Lens Focus.	£ s. d.	Camera. No.	Lens Focus.	£ s. d.
153	2½×3½	6½× 9	5¼ in.	32 0 0	151	4¾ in.	30 0 0
201	3¼×4¼	8×10.5	6½ in.	38 0 0	161	6 in.	32 0 0
203	—	9×12	7 in.	42 0 0	163	6 in.	32 0 0
204	3¼×5¼	10×15	8¼ in.	50 0 0	164	6½ in.	38 0 0
206	4¾×6½	12×16½	8¼ in.	58 0 0	166	8¼ in.	50 0 0
208	5 ×7	13×18	8¼ in.	58 0 0	168	8¼ in.	50 0 0
—	Stereo	45×107	—	—	181	3 in.	40 0 0
—	Stereo	6×13	—	—	182	3½ in.	42 0 0
			With Zeiss Tessar F/2.7.				
0153	2½×3½	6½× 9	5¾ in.	42 0 0	0151	4¾ in.	39 0 0
0201	3¼×4¼	8×10.5	6½ in.	50 0 0	0161	6½ in.	46 0 0
0203	—	9×12	6½ in.	50 0 0	0163	6½ in.	46 0 0
—	Stereo	6×13	—	—	0182	4¾ in.	60 0 0

1153 2½×3½ with Rietzschel Prolinear F/1.9, 5¼ in. **£57 10s. 0d.**

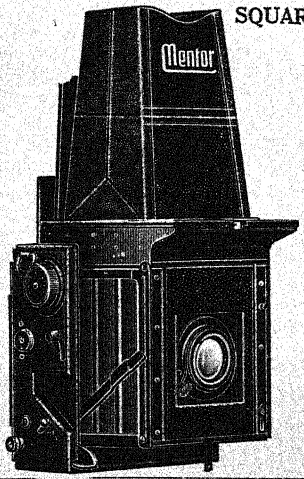
Mentor Studio Reflex with Swinging Front. Particulars on application.

Film-pack Adapter, Automatic Changing Boxes, Roll Film Holders, Metal Slide Adapter, Metal Slides, extra.

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MENTOR FOLDING REFLEX

SQUARE MODEL.



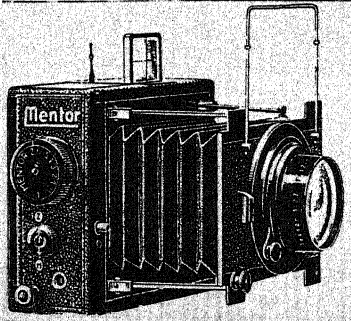
Fitted with Self-Capping Rollo Focal Plane Shutter.

The most compactly built square model. When closed, the upper focusing screen, its frame, the viewing funnel and cover are self-contained, and the camera closes in from the front, covering lens completely. A lever on the front enables the lens board to be brought into position on its struts, absolutely parallel to the back focusing screen. The reflecting mirror then assumes its normal position of 45° between the two screens.

PRICES :

(including Zeiss Tessar F/4.5 in focusing mount, 3 double dark Slides, Cable Release and Strap).

Camera No.	Size.	Dimensions over all.	Lens Focus.	£ s. d.
131	2½×3½ in. 6½× 9 cm.	2¾×5½×6 in.	4¾ in	42 0 0
134	3¼×4¼ in. 8 ×10.5 cm.	3⅛×6¾×7⅞ in.	6 in.	48 0 0
136	— 9 ×12 cm.	3⅛×6¾×7⅞ in.	6 in.	48 0 0
138	3½×5½ in. 10×15 cm.	3⅜×7⅝×8½ in.	8½ in.	57 0 0
	Special Model with Zeiss Tessar F/2.7.			
0131	2½×3½ in. 6½× 9 cm.	3½×5½×6 in.	4¾ in.	52 0 0



MENTOR FOCAL PLANE CAMERA

The ideal Camera for Press, Sports and similar work. This Camera is extremely compact, light, rigid and durable, and is thoroughly reliable at all times.

PRICES : (including Zeiss Tessar F/4.5 or F/2.7 in focusing mount, 3 double Slides and Cable Release)

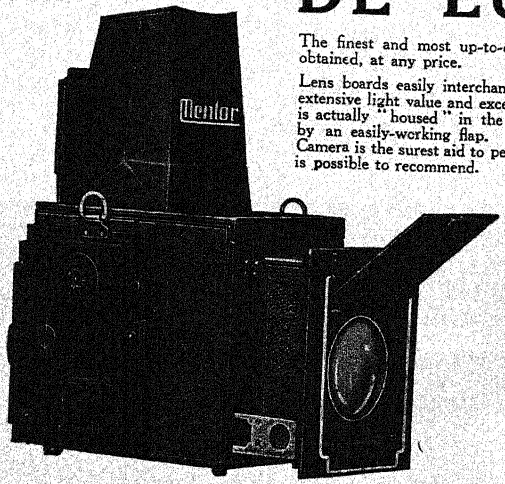
Size. Inch.	Size. Cm.	With Zeiss Tessar F/4.5 Camera No.	Lens Focus.	£ s. d.	With Zeiss Tessar F/2.7 Camera No.	Lens Focus.	£ s. d.
2½×3¼	6½× 9	221	4¾ in.	25 0 0	0221	4¾ in.	34 0 0
3¼×4¼	8×10.5	223	6 in.	28 0 0	0223	6½ in.	43 0 0
—	9×12	225	6 in.	28 0 0	0225	6½ in.	43 0 0
3¼×5½	10×15	228	6½ in.	32 0 0	—	—	—
5 ×7	13×18	232	8½ in.	40 0 0	—	—	—

Film-pack Adapter, Automatic Changing Boxes, Roll Film Holders, Metal Slide Adapter, Metal Slides, Extra.

The Mentor of Mentors

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The finest and most up-to-date camera that can be obtained, at any price.

Lens boards easily interchangeable. Lenses of most extensive light value and exceptional focus. The lens is actually "housed" in the camera and is protected by an easily-working flap. The ownership of this Camera is the surest aid to perfect photography that it is possible to recommend.

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Size.		With Zeiss Tessar F/4.5.			With Zeiss Tessar F/2.7.		
Inch.	Cm.	Camera No.	Lens Focus	£ s. d.	Camera No.	Lens Focus	£ s. d.
2¼×3¼	6½× 9	271	5½ in.	40 0 0	0271	5½ in.	50 0 0
3¼×4¼	8 ×10.5	274	6 in.	52 0 0	0274	6½ in.	61 0 0
—	9 ×12	275	7 in.	52 0 0	0275	6½ in.	61 0 0

2½×3½ No. 1271 with Rietzschel Prolinear F/1.9, 5¼ in., **£64.**

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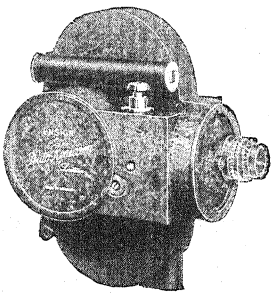
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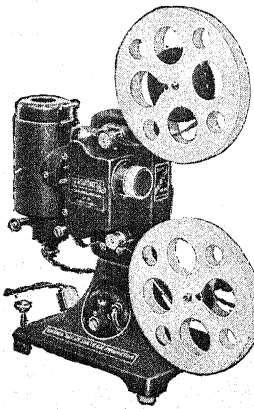
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ENSIGN "AUTOKINECAM" CAMERA, complete with one 100-ft. empty spool and one 50-ft. empty spool, fitted with "Cinar" f/2.6 Anastigmat, complete in best English hide, brown leather, velvet-lined carrying case. **Price 25 Guineas.**



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The workmanship throughout is of the highest order and constitutes a veritable triumph for British craftsmanship.

Complete with 400-ft spool, 60-volt, 100-watt lamp, resistance for use on any voltage from 100 to 250 volts, drip feed oil bottle and spare "take up" spring—contained in a well-made transport box with partitions for resistance, spares, and additional spools. **Price 25 Guineas.**

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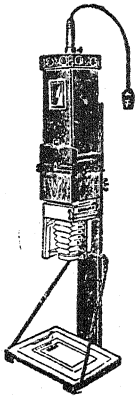
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THE "WILMAC SENIOR" de Luxe Pocket Camera. An outfit for the critical worker (*as illustrated*). Double extension, rise and cross front, leather covered and leather bellows, brilliant and direct vision finders. Fitted with f 4.5 Wilmac Anast. Lens in Compur Shutter. Complete for either plates or film packs. Really exceptional value. **Price £7/7/-.**



WILMAC VERTIC ENLARGER.

The simplest enlarger and most economic in price on the photographic market. Made either for gas or electric illuminant, and supplied either (*a*) to use with your own camera; (*b*) with your own lens or (*c*) complete with Anastigmat lens. Only made in 3½ x 2½ and 4¼ x 3¼ sizes.

Priced: 3½ x 2½ sizes—
45/- 57/6 £5/2/6

4¼ x 3¼ size—
67/6 80/- £6/10/-

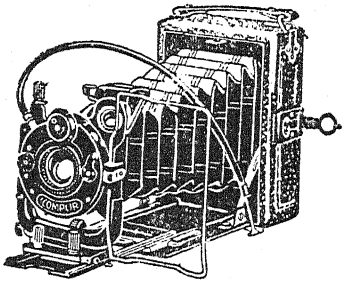
Supplied in Exchange or on Easy Terms.

GADGETS FOR THE AMATEUR. Exposure Meters, Filters, Sky Filters and Shades, Shutters, View Finders, Tanks, Printing Frames, Self Timers. Everything the photographer wants you can obtain through Wilmac Service. Get **"Money-Making Photography"** from your Newsagent every month, it will keep you *au fait* with everything new, and help you make your photography a hobby worth while.

Every Make of Camera

FOR CASH, IN EXCHANGE, OR ON EASY PAYMENTS

Wilmac Service Stocks every popular camera on the market, both English and Continental makes. All apparatus by Kodak, Houghton Butcher, Dallmeyer, Thornton-Pickard, Apem, Zeiss Ikon, Bell Howell, Victor, De Vry, Pathe, Agfa, etc. Whatever equipment you require, get in touch with Wilmac for Catalogues and a quotation. You are always assured prompt delivery and the Lowest Prices—and better exchange allowances.



WILMAC ALBUMS. The albums that are made like a ledger. Ring fastening, quick in operation, loose leaves, always open flat. Made with stiff cloth covered cover and finest art leaves. Supplied in two sizes, and in Brown, Grey or Black colours. 9" x 7" size, **4/-**; 12½" x 9" size, **5/-**. Post Paid. Spare leaves supplied.

TELESCOPIC TRIPODS. Special five-section, rigid brass. Contenental manufacture, extend to 51½" high. Compact, firm when erected and extremely light. A line we cannot repeat at the price when existing stocks are sold.

Price 8/6 each. Post Paid.

WILMAC POSTCARDS. Made in gaslight or bromide grades and in velvet, glossy or Matt surfaces The ideal card for contact printing or enlarging. Wonderful emulsion. Equal to the best cards on the market. **Price 3/6** per 100 Post Paid.

We are Photo Finishers—Developing, Printing and Enlarging at usual rates. Guaranteed quality always.

WILMAC

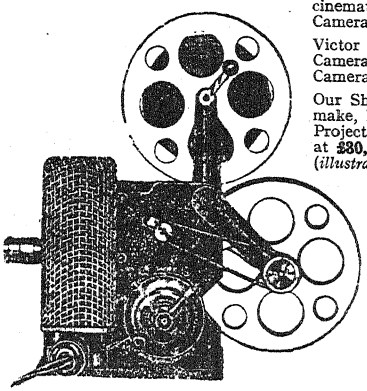
Wm. Mc. Intosh (Sheffield) Ltd
CHANGE ALLEY
SHEFFIELD.

Cine Kodaks, Kodascopes, etc.

The Wilmac Cinematograph Section supplies everything, either for amateur or professional cinematography. We have Cine Kodak Cameras at **£18/18/-, £25** and **£31/10/-.**

Victor Cine Cameras at **£46,** Baby Pathe Cameras at **£5** or **£10/10/-,** Bell Howell Filmo Cameras at **£30** or **£57/10/-.**

Our Showrooms contain Projectors of every make, Kodascopes at **£18** and **£50.** Filmo Projector at **£61/10/-,** Pathe at **£6.** De Vry at **£30,** and the **New Model C Kodascope** (*illustrated opposite*) at **£89/10/-.**



The Model "B" Kodascope is most ingenious in construction, self threading, reverse action, and only weighs 14 lbs. It gives a most brilliant picture and is the last word in efficiency. Write for Wilmac Cine Lists, they will tell you everything about Cine apparatus of every make.

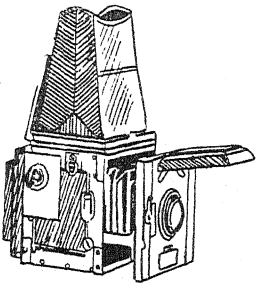
We specialise in Equipment for Tours, Expeditions, etc. Ask Wilmac's advice first.

Reflex Cameras.

We stock and supply Graflex, Ensign, Pressman, Thornton-Pickard, Dallmeyer, Ica and other popular makes. Dallmeyer, T.P. Ensign Models with f 4.5 lenses in 3¼ x 2½ size at **£11/5/-,** or with f 3.5 lenses at **£15,** or with f 2.9 lenses from **£23/10/-.**

Quarter-plate Models at **£12, £15/15/-** and **£26.** Special Tropical Ensign Reflex, made in teak brass bound and in 3¼ x 2½ or 4¼ x 3¼ sizes, with f 4.5 Anastigmat lens **£18** or **£19,** or with f 3.4 Anastigmat lens, **£20** or **£22. T.P. Duplex Reflexes,** extra long extension (*as illustrated*), specially suitable for Telephoto work and big game, or naturalist work. Outfits from 3¼ x 2½ to ¼-plate size ranging in Price from **£26/10/-.**

Overseas photographers can have every confidence in placing orders for equipment with Wilmac Service. Every individual foreign order is handled by our Managing Director personally.



Try "SPREDFIX" when you mount your next photos. The modern mountant in a self-spreader tube. Clean, quick, never goes hard. **Tubes 1/- or 1/6** from all Photo Dealers or from *Sole Agents:* **Wilmac** Service.

COLOUR PHOTOGRAPHY. If you are interested in Colour photography or colour cinematography write Wilmac for advice and supplies—he has specialised in every process during the last twenty years.



Voigtländer

Your New Camera . . . . .

PERHAPS you already own a camera which has served you well, collecting the rich harvest to which your Albums testify. Perhaps, also, this camera of yours is worn out, or is of obsolete pattern, heavy, bulky, or otherwise old-fashioned and you realise it is time to make a change, purchasing not only another one but a better one

Choosing a camera, or, rather choosing *the* camera is not a simple task, because appearances are often deceptive. Thus the safest way is to rely on the reputation of a famous maker

Now this is where the Voigtländer Company which has seen the introduction of photography—being established many years before the first photograph was taken—are of the greatest service to the potential purchaser. The first Voigtländer camera was made in 1840 shortly after the first Daguerrotypes, and with its knowledge of the requirements of photographic enthusiasts, the Voigtländer Company is in a unique position to manufacture apparatus which is *unequalled* in *design* and *quality* and—by virtue of gigantic sales—*value*.

If you choose a Voigtländer camera, you obtain the best you can possibly get for the price. Therefore, to derive complete and lasting satisfaction your new camera

. . . . . should be a

Voigtländer

First in 1756: First To-day.

Sole Importers and Wholesale Distributors in Gt. Britain and Ireland:

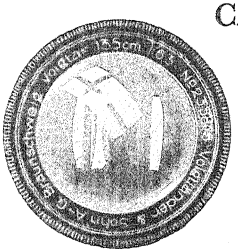
PEELING & VAN NECK, LTD.,
4-6, HOLBORN CIRCUS, LONDON, E.C.1.

Telephone: **Central 9196**

Telegrams: **Photopsia, Phone, London.**

Voigtländer

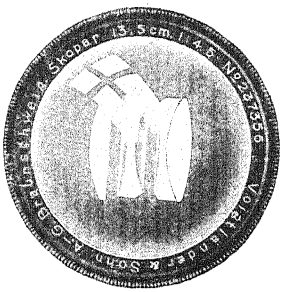
The LENSES fitted to VOIGTLÄNDER CAMERAS



Voigtar F/6.3
Triple Anastigmat, 3 lenses



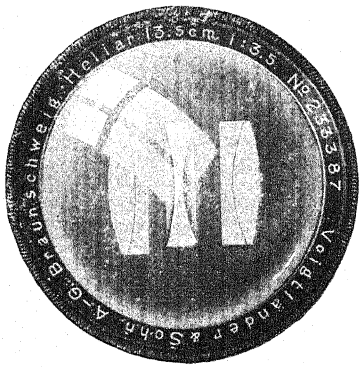
Collinear F/6.3
Convertible Anastigmat, 6 lenses



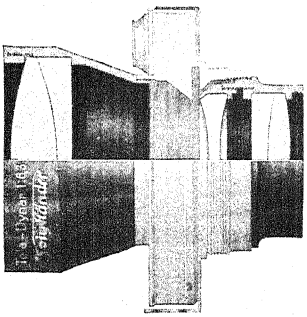
Skopar F/4.5
Triple Anastigmat, 4 lenses



Heliar F/4.5
Triple Anastigmat, 5 lenses



Heliar F/3.5
Triple Anastigmat, 5 lenses

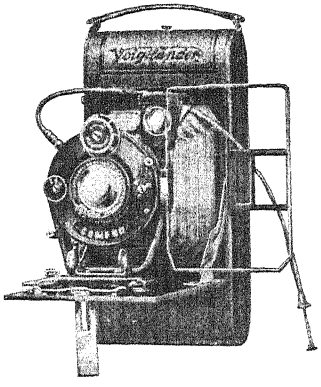


Tele-Dynar F/6.3
Fixed-focus telephoto-lens fitting the shutters of our hand cameras, 5 lenses

VOIGTLÄNDER LENSES IN ACTUAL SIZE FOR 5¼″ FOCUS.

Voigtländer

Rollfilm



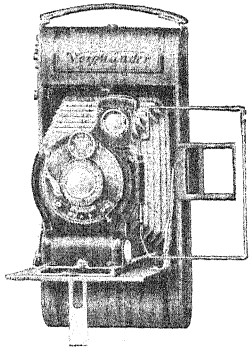
3 × 2, 3¼×2¼, 4¼×2½

IT is only by virtue of the vast quantity made that this Voigtländer camera can be sold at such low prices. Neat, compact and light, it is the best Rollfilm camera offered to-day. Every part has been designed for maximum efficiency, whilst the sturdy construction will ensure long service.

SPECIFICATION OF BOTH MODELS:

Body: Hardened aluminium alloy.
Finish: Neat black leather, metal parts nickel plated or black enamelled.
Focussing: Rollfilm has radial-device, distances in feet; Perkeo has two focussing distances, to which front springs out.
Viewfinders: Brilliant reversing finder, also wire direct vision, with sighter at back.
Bellows: Best quality black leather.
Front: New design, giving great rigidity.

Perkeo



3¼×2¼ only

A new introduction for 1929. Special leaflet free upon application.

THE very camera for amateurs—beginners or advanced workers—who require a model which is self-erecting, ready for work in a moment. The baseboard falls down upon pressure of the release-catch, and the front springs out immediately.
Price, with Voigtländer Voigtar F/6.3 anastigmat lens in Embezet Shutter **£5 5 0**
(Accessories under column 3¼×2¼" below.)

PRICES OF ROLLFILM MODELS:

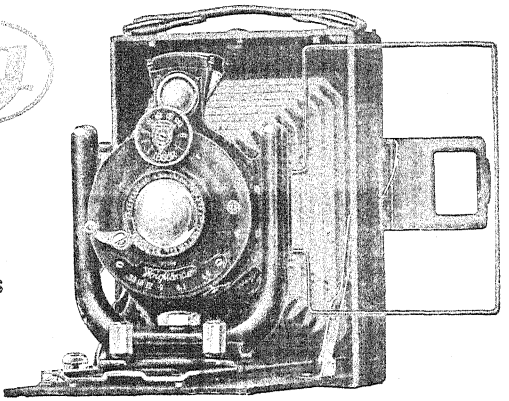
Lenses	Shutters	3"×2"	3¼"×2¼"	4¼"×2½"
VOIGTAR F/6.3	Embezet	£3 17 6	£4 10 0	£5 5 0
VOIGTAR F/6.3	Ibsor	—	5 5 0	6 0 0
SKOPAR F/4.5	Compur	6 0 0	6 17 6	7 12 6
HELIAR F/4.5	Compur	8 17 6	9 12 6	10 15 0
ACCESSORIES:				
Yellow Filter 2× or 5× (see page 642) ..		£0 17 6	£0 17 6	£0 17 6
Finder Magnifier (see page 642)		0 5 0	0 5 0	0 5 0
Leather Case, black or tan, velvet lined, with lock and key		0 10 6	0 12 6	0 13 6
Ditto, unlined, second quality		0 6 6	0 9 0	0 10 6
Roll Films, 6 exposures ..	per spool	0 1 3	0 1 2	0 1 5

Voigtländer

Vag.

$3\frac{1}{2}\times2\frac{1}{2}$ and

$4\frac{1}{4}\times3\frac{1}{4}$ sizes



ALTHOUGH remarkably cheap, it must not be inferred that this camera is not worth the attention of serious photographers, as, like all Voigtländer cameras, it is made with infinite care. An ideal camera for travelling purposes, where the user prefers filmpacks or plates to roll-films.

SPECIFICATION :

Body : Aluminium alloy.

Finish : Neat black leather, metal parts black enamelled or nickel plated

Focussing : Radial movement, distances in feet.

Extension : Single.

Front : New design with rising and cross movements.

Viewfinders: Brilliant revolving type and direct vision finder with sighter at back.

Bellows : Best quality black leather.

Accessories : Three single metal plate holders, and cable release.

PRICES :

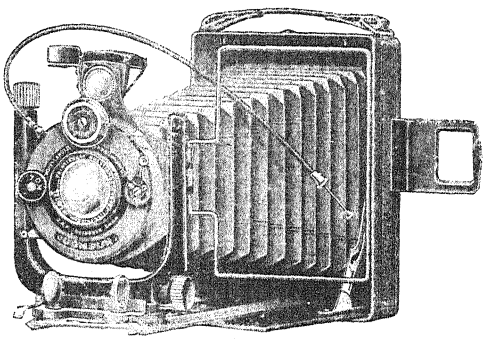
Lenses	Shutters	$3\frac{1}{2}''\times2\frac{1}{2}''$	$4\frac{1}{4}''\times3\frac{1}{4}''$
VOIGTAR F/6.3	Embezet	£4 4 0	£4 17 6
VOIGTAR F/6.3	Ibsor	5 2 0	5 15 0
SKOPAR F/4.5	Ibsor	6 5 0	7 5 0

ACCESSORIES :

Extra Single Metal Slides	£0 2 3	0 3 0
Film Pack Adapter	0 8 6	0 10 0
Yellow Filter for Voigtar F/6.3 (see page 642) 2× or 5×	0 17 6	0 17 6
,, Skopar F/4.5		1 2 6
Focar Lens (reducing, for Skopar only)	0 12 6	0 15 0
Finder Magnifier (see page 642)	0 5 0	0 5 0
Leather Case to hold camera and 6 slides (or 3 slides and film pack adapter)	0 15 0	0 17 6

Voigtländer

Avus



$3\frac{1}{2} \times 2\frac{1}{2}$

$4\frac{1}{4} \times 3\frac{1}{4}$

sizes.

THE Avus Camera is very light and compact, and is another example of the remarkable value Voigtländer offer. Full double extension is provided, which enables the Voigtländer Focar Lenses to be used for long distance work, and a rack and pinion operates the rising and cross front movement.

SPECIFICATION:

Body: Light aluminium alloy.

Finish: Black morocco leather, metal parts black enamelled or nickel plated.

Focussing: Rack and pinion movement, with infinity catch.

Extension: Double.

Front: New design "U" front, with rising and cross movements by rack and pinion.

Viewfinders: Brilliant revolving pattern with spirit-level attached, also wire direct-vision finder with sighter at back.

Bellows: Best quality black leather.

Accessories: Three single metal plate holders and cable release.

PRICES:

Lenses	Shutters	$3\frac{1}{2}$"×$2\frac{1}{2}$"	$4\frac{1}{4}$"×$3\frac{1}{4}$"
VOIGTAR F/6.3	Ibsor	£6 7 6	£7 7 0
SKOPAR F/4.5	Ibsor	7 7 0	8 17 6
SKOPAR F/4.5	Compur	8 8 0	10 0 0

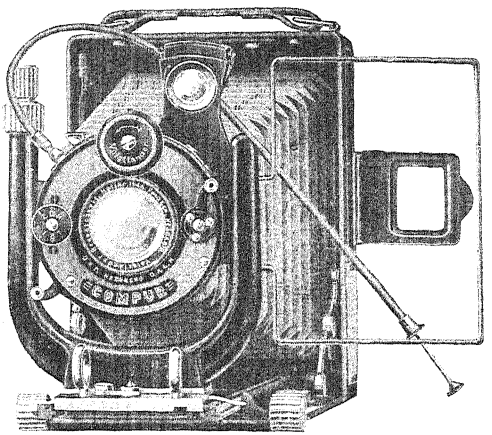
ACCESSORIES:

Extra Single Metal Slides	£0 2 3	£0 3 0
Film Pack Adapter	0 8 6	0 10 0
Leather Case, velvet lined	0 17 6	1 1 0
Yellow Filter (2× or 5×) for Voigtar F/6.3 (see page 642) ,, Skopar F/4.5	0 17 6	0 17 6 1 2 6
Focar Lens for Voigtar F/6.3 (see page 642) for Skopar F/4.5	0 12 6	0 14 0 0 15 0
Tele-Dynar F/6.3 (see page 636), 8" focus, fitting all shutters	6 10 0	—
Ditto, 10" focus, fitting Skopar shutter only	—	8 0 0

Voigtländer

Tourist

$3\frac{1}{2} \times 2\frac{1}{2}$ in.
$4\frac{1}{4} \times 3\frac{1}{4}$ in.
10×15 cm.



A PART from the many unique features shown in the specification, the Tourist Camera is worthy of the attention of every serious photographer who desires the best camera he can get at a reasonable price. The Voigtländer Tourist is a real **de luxe** Camera—a triumph of craftmanship.

SPECIFICATION :

Body : Light and strong aluminium alloy.
Finish : Black morocco leather, metal parts black enamel or nickel plated.
Focussing : Double rack and pinion, new clamping device, and infinity catch.
Extension : Double.
Front : New design "U" front of great rigidity, with new and handy rising and cross movements by rack and pinion ; spirit levels are sunk in the milled heads operating focussing and cross movements.

Viewfinders : Brilliant revolving type and direct vision wire finder, with sighter at back.

Struts : Locking device to prevent camera being accidentally closed before the front is pushed back.

Bellows : Best quality black leather.

Accessories : Three single metal plate holders and cable release.

PRICES :

Lenses			Shutters	$3\frac{1}{2}$″×$2\frac{1}{2}$″	$4\frac{1}{4}$″×$3\frac{1}{4}$″	10×15 cm.
COLLINEAR	F/6.3	..	Compur	£12 15 0	£14 17 6	£19 5 0
HELIAR	F/4.5	..	Compur	13 0 0	16 0 0 (a) 17 10 0 (b)	21 12 6 (c) 22 17 6 (d)
HELIAR	F/3.5	..	Compur	16 0 0	—	—
SKOPAR	F/4.5	..	Compur	—	—	16 10 0

(a) $5\frac{1}{4}$″, (b) 6″, (c) $6\frac{1}{2}$″, (d) 7″ focus.

ACCESSORIES :

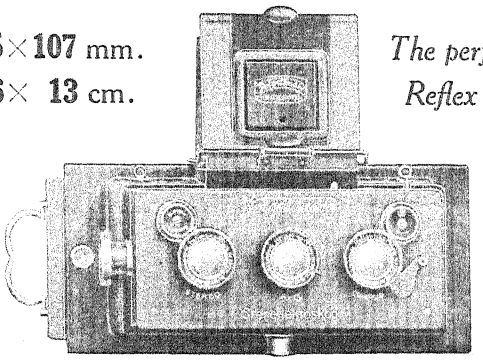
Extra Single Metal Slides	£0 2 3	£0 3 0	£0 3 6
Film Pack Adapter	0 8 6	0 10 0	0 12 6
Yellow Filter (2× or 5×) (see page 642) ..	0 17 6	1 2 6	1 10 0
Focar Lens (see page 642)	0 12 6	0 16 6	0 17 6
Leather Case, velvet lined	0 17 6	1 1 0	1 7 6

Voigtländer

Stereflectoscope

45×107 mm.
6× 13 cm.

The perfect Reflex Stereo



STEREOSCOPIC photography—in which pictures showing plastic relief are obtained—is, perhaps, the most fascinating branch of the hobby. There are many cheap stereo cameras obtainable, but only one like the Voigtländer Stereflectoscope will render results which are perfectly lifelike, owing to the high efficiency Stereoscopic photography demands of the camera

SPECIFICATION :

Lenses : 2 taking and 1 reflex Heliar F/4.5, 65 mm. focus for 45×107 mm., 75 mm. focus for 6×13 cm.

Shutter : Reliable Compur shutter (Speed up to 1/250th second).

Body : All metal, leather covered.

Finish : Metal parts black enamelled, fittings nickel plated.

Focussing : Rack and pinion wheel movement, with engraved scale.

Extension : Single, focussing from 5 (4) feet to infinity.

Viewfinders : Special reflex focussing screen, with sunk spirit level. For work at eye-level the 45×107 mm. model is fitted with a collapsible direct vision finder, and the larger model with a folding wire frame finder on top.

Changing Box : All metal for twelve ordinary or 8 colour plates, with plate number indicator.

PRICES :	45×107 mm.	6×13 cm.
Stereflectoscope, with three HELIAR F/4.5 Lenses, with Changing Box, complete in tan leather case with shoulder strap	£30 0 0	£36 5 0

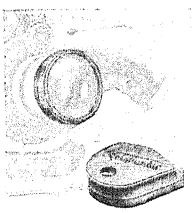
ACCESSORIES :

Single Black Metal Slides*	£0 2 3	£0 2 6
German Silver ditto*	0 5 0	0 6 0
Film Pack Adapter*	0 7 6	0 10 0
Adapter for single metal slides or film pack adapter*	0 16 0	0 18 6
Pair of Yellow Filters, matched (2 times or 5 times)	1 15 0	1 15 0
Magnifier (5×) to fit over reflex hood	1 2 6	—
Supplementary lenses (set of 3 matched lenses)	1 11 6	—

* For single metal slides or a film pack adapter a special adapter is necessary.

Voigtländer

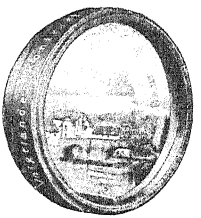
FOCAR LENSES



By attaching a Focar Lens to an ordinary camera lens, you get a choice of long foci. Also wide-angle lens.

Prices from 12/6

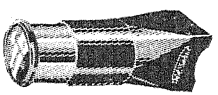
YELLOW FILTERS



Made in 2 strengths : Alpha 2 × and Beta 5 ×. To secure correct colour rendering, clouds, etc.

Prices from 17/6

FINDER MAGNIFIER



Fits over the brilliant viewfinder of the camera. Magnifies the image 4× and shades it. **Price 5/-**

Voigtländer

WORLD-FAMOUS LENSES

HELIAR F/3.5
For Universal High Speed Work

	a	b	c	d
4¾″	£8 8 0	£8 16 0	£10 0 0	£10 8 0
5½″	11 4 0	11 12 0	12 16 0	13 4 0
6″	12 16 0	13 4 0	14 8 0	15 4 0
6½″	13 12 0	14 0 0	15 4 0	16 16 0
7½″	16 8 0	16 16 0	18 0 0	20 8 0
8½″	20 0 0	21 4 0	22 16 0	24 0 0

HELIAR F/4.5
High Speed Work with critical definition

	a	b	c	d
4¾″	£6 16 0	£7 4 0	£8 16 0	£7 15 0
5½″	7 9 0	7 15 0	10 3 6	9 0 0
6″	8 11 0	9 0 0	10 19 6	10 8 0
6½″	9 12 0	10 8 0	12 16 0	12 8 0
7½″	11 4 0	12 0 0	14 8 0	14 0 0
8½″	14 8 0	15 4 0	18 8 0	17 12 0

HELIOSTIGMAT F/2.5
For Portraiture with Perfect Modelling

8½″	a	£49 5 0
13¼″	a	72 0 0

Cine-Heliostigmat F/2.5

1⅝″	a	£7 4 0	c	£8 16 0
2″	a	8 0 0	c	9 12 0
3″	a	9 4 0	c	10 16 0
4″	a	12 0 0	c	13 12 0

COLLINEAR F/6.3
A universal convertible lens

	a	b	c	d
4½″	£6 0 0	£6 8 0	£7 4 0	£7 4 0
4⅝″	6 8 0	6 16 0	8 0 0	7 9 0
5½″	7 4 0	7 12 0	9 4 0	7 15 6
6″	7 15 0	8 3 0	9 15 0	9 4 0
8″	12 0 0	12 8 0	14 8 0	13 4 0
12″	25 4 0	—	—	26 16 0

Wide-angle Collinear F/12.5
For critical wide-angle work

4½″	a	£6 0 0
4⅝″	a	7 4 0
6″	a	8 3 0
7½″	a	9 5 0
8″	a	10 1 6
10″	a	13 8 9
12½″	a	16 0 0

TELE-DYNAR F/6.3
The Ideal Telephoto Lens

	c	d	Cells only
5½″	—	£8 16 0	£5 12 0
7⅝″	£10 0 0	9 12 0	6 8 0
10″	12 0 0	11 12 0	8 0 0
11⅞″	14 8 0	13 12 0	9 12 0
12⅝″	16 0 0	14 16 0	10 16 0

a—Normal Mount b—Sunk Mount c—Focussing Mount d—Compur Shutter

Send for a copy of the Voigtlander Lens List, in which the fullest details of these and other Voigtlander Lenses are given.

N.B. *Although every effort is made that the foregoing particulars are correct, all prices are quoted without engagement or liability, and are liable to alteration without notice.*

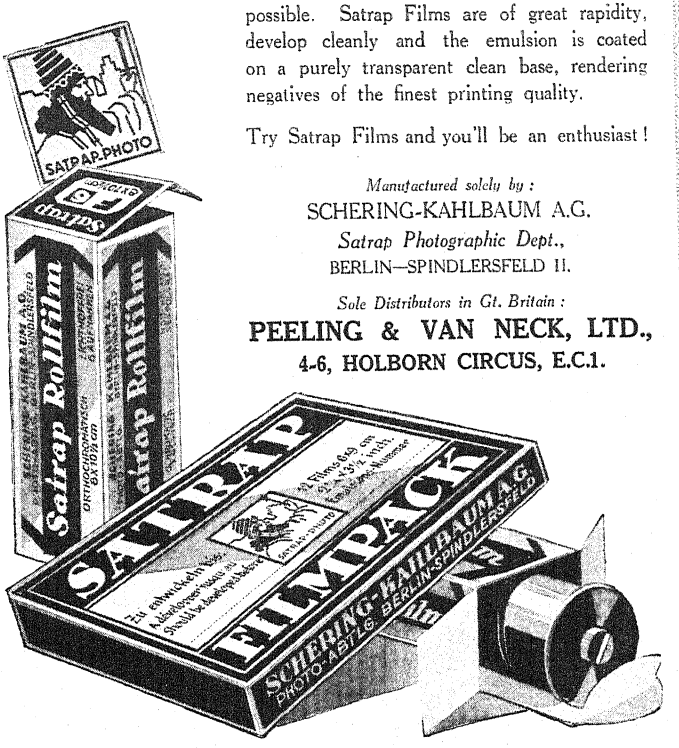
Satrap Films

WHILST nearly all films sold to-day are good, Satrap Films are *better*, revealing in the negatives just that shade of difference and quality which indicates the finest materials possible. Satrap Films are of great rapidity, develop cleanly and the emulsion is coated on a purely transparent clean base, rendering negatives of the finest printing quality.

Try Satrap Films and you'll be an enthusiast!

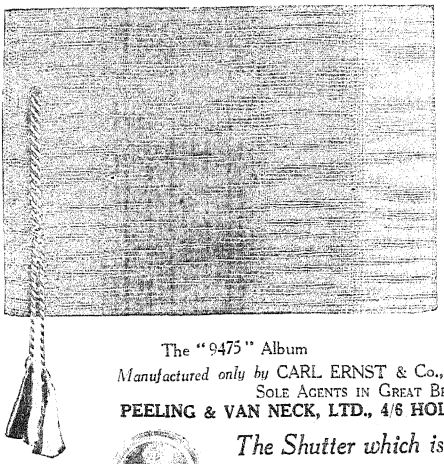
Manufactured solely by :
SCHERING-KAHLBAUM A.G.
Satrap Photographic Dept.,
BERLIN—SPINDLERSFELD II.

Sole Distributors in Gt. Britain :
PEELING & VAN NECK, LTD.,
4-6, HOLBORN CIRCUS, E.C.1.



CECO ALBUMS

A New Series of Unconventional Design



AN adequate idea of the beautiful finish of Ceco Albums cannot be conveyed by an illustration. They are made in only 4 sizes (A, $5\frac{1}{4} \times 4''$; B, $7\frac{1}{2} \times 5\frac{1}{4}''$; C, $9\frac{1}{2} \times 6\frac{3}{8}''$; D, $11\frac{3}{8} \times 8\frac{1}{2}''$), and all contain 24 leaves, dark brown, for pasting on.

The album illustrated has a cover of art-silk of repp pattern, shot with mauve, blue, brown, red, green, etc., with silk tassel. There are 12 other exceedingly choice designs described in a special list, which will be gladly sent upon application.

Sizes (see above)	A	B	C	D
Prices	4/-	5/9	8/6	12/-

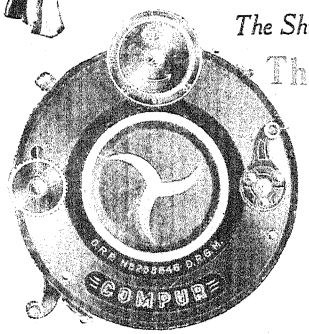
The "9475" Album

Manufactured only by CARL ERNST & Co., Nachf, Berlin-Schoneberg.

SOLE AGENTS IN GREAT BRITAIN :

PEELING & VAN NECK, LTD., 4/6 HOLBORN CIRCUS, E.C.1.

The Shutter which is Standard Equipment



The COMPUR SHUTTER

fitted by every high-class camera-maker all over the world.

UNIVERSALLY recognised as the finest between-lens shutter made, the Compur is a fundamentally important part of the camera. The mechanism is controlled by a gear escapement movement, and the speeds are so accurate, that tests have proved that the difference, if any, between engraved and actual speeds does not exceed 10 per cent.

Sole Manufacturers :

FR. DECKEL, Munich, Germany.

Series No.	Tube No.	Iris Diameter	Diameter of Inside Tube thread	Speeded to	Price £ s. d.
00	Normal	15 mm.	19 mm.	1/300	
0	,,	22 ,,	27 ,,	1/250	2 17 6
0	Wide	22 ,,	28 ,,	,,	
0	I	22 ,,	25 ,,	,,	
I	Normal	27 ,,	30 ,,	1/200	3 10 0
Ia	3	27 ,,	35 ,,	,,	
2	4	30 ,,	40 ,,	1/150	3 17 6
2	5	35 ,,	45 ,,	,,	
3	6	35 ,,	49 ,,	,,	4 12 6

Sole Wholesale Distributors for Great Britain:

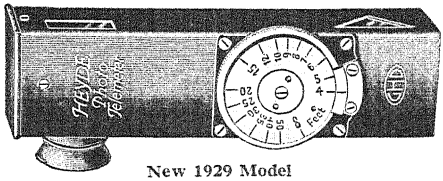
PEELING & VAN NECK, Ltd., 4-6 Holborn Circus, E.C.1

Perfect Exposure - -

- - Critical Focussing

secured with greatest ease by the

HEYDES TELEMETER



New 1929 Model

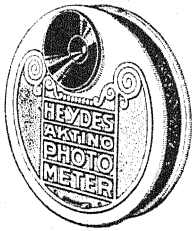
HOW frequently what would otherwise be a perfect photograph is ruined by inaccurate focussing! The Heydes Telemeter prevents any such defect, as, by simply looking through it and turning the wheel, the exact distance the camera is from the subject is perfectly measured for you.

The optical system consists of two optically-worked prisms, one of which is fixed and the other so arranged that a slight movement is obtained. By turning the wheel, on which all distances from 4 feet to infinity are engraved, the images seen through the sighter become in correct alignment and form one. The user then simply reads the distance and sets the camera focus accordingly. Done in a moment, and accurate.

Price, complete in leather case with full instructions for use **32/6**

AND THE

HEYDES ACTINOMETER



CORRECT exposure at a glance without any calculations by simply observing the subject to be photographed. No sensitive paper to expose or deteriorate.

The Heydes Actinometer is the most reliable in use as it gauges the actinic value of the light rays from the subject actually being taken, which may be quite different from that where the photographer is standing.

The model V Heydes Actinometer is engraved for both interiors and exteriors, and it takes only a moment to find out the correct exposure for any lens speed or plate, film, etc.

Price, complete in leather case with full instructions for use **15/-**

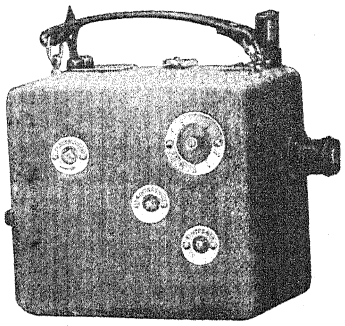
Sole Wholesale Distributors in Gt. Britain :

PEELING & VAN NECK, Ltd., 4-6, Holborn Circus, E.C.1

The World's Best Amateur Cine-Cameras

CINE-NIZO

(Models F & H for 9½ mm. Film)



Cine-Nizo 16 mm. Model B

CINE-NIZO 9½ mm. MODEL F

AN extremely neat and compact model, with spring motor, the speed of which is adjustable. After one winding, the whole length of film in the camera is carried through without re-winding. The loading of the films is extremely easy and convenient.

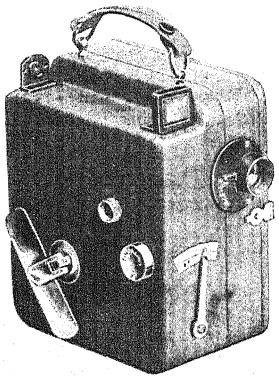
Prices upon application

(Model B for 16 mm. Film)

CINE-NIZO 16 mm. MODEL B

NO other amateur cine camera is as neat and efficient as the 16 mm. model B Cine Nizo. It has a fool-proof motor which carries the film evenly, and also a hand-crank adjustable for single pictures and sixteen pictures per second The handle crank can be used *intermediately* with the spring motor. One magazine is provided to take 33 ft. 16mm. film.

Prices upon application.



Cine-Nizo 9½ mm. Model F

THE CINE-NIZO 16 mm. MODEL C FOR 100 FEET FILM

A NEW model of the famous Cine-Nizo Camera will be marketed shortly. It will take 100 feet daylight-loading films, with spring-motor (with intermediate crank-drive) and adjustable speed, a film-meter showing length of film exposed whilst photographing, and an adjustable shutter. A perfect and beautiful instrument.

READY SHORTLY !

Cine-Nizo Cameras are Manufactured Solely by :

NIEZOLDI & KRAMER, G.M.B.H., MUNICH, GERMANY

Sole Importers and Wholesale Distributors in Gt. Britain and Ireland :

PEELING & VAN NECK, LTD., 4-6, Holborn Circus, London, E.C.1.

MOVIE-MAKING FOR ALL



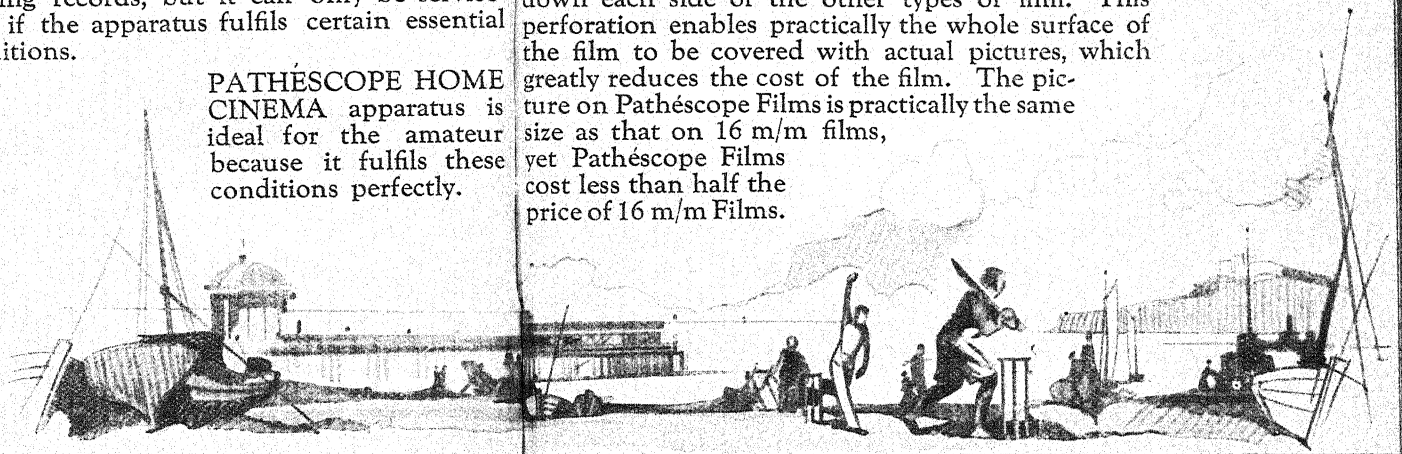
Introduction

THERE are few hobbies so fascinating as making and showing one's own cinema pictures. 'Movies' are infinitely superior to ordinary snapshots, as records. Snapshots, good as they may be, record the happenings of just one instant of time, whereas a 'movie' picture, taken on the same occasion, records the whole scene, rounded off, with action, atmosphere and life. A moving picture is a living memory, stored away, ready to be brought to life upon the screen, bringing back the whole incident complete in every detail, every action reproduced as it actually happened. The cinema is indeed ideal for keeping records, but it can only be serviceable if the apparatus fulfils certain essential conditions.

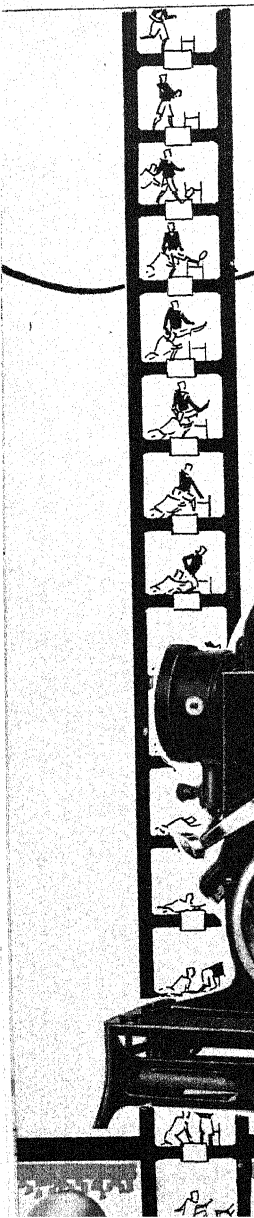
PATHÉSCOPE HOME CINEMA apparatus is ideal for the amateur because it fulfils these conditions perfectly.

These essential conditions are as follows: The apparatus must be efficient, compact, portable, simple to use and manipulate and as free from complication as possible. Films must be easy to develop and store and, above all, they MUST BE NON-INFLAMMABLE. Then, for films and apparatus alike, the price and upkeep must be reasonable. Pathéscope apparatus alone satisfies every one of these essentials, providing, at reasonable cost, compact, reliable and simple accessories to meet the Amateur's every need.

PATHÉSCOPE FILMS are the most economical on the market. They are perforated down the centre, thus economising the wasteful perforation margin down each side of the other types of film. This perforation enables practically the whole surface of the film to be covered with actual pictures, which greatly reduces the cost of the film. The picture on Pathéscope Films is practically the same size as that on 16 m/m films, yet Pathéscope Films cost less than half the price of 16 m/m Films.



Project



THE PATHÉSCOPE PROJECTOR for showing 'movies' is remarkably compact, extremely efficient and simple to operate. It is lit by connecting to the electric supply, or to batteries, the source of light being a small electric lamp of exceptional brilliance.

Placing the film is easier than threading a needle. The film is automatically 'taken up' and a few turns of a small handle at the conclusion, suffice to re-wind the film into its container. Pictures can be shown up to 3 ft. by 2 ft. 6 in. or larger and are bright sharp and flickerless. The Projector can be worked either by hand or by means of an electric motor. A simple attachment, which can be fitted to the machine in a moment or two, enables the showing of large reels of 300 ft. in length, which give an uninterrupted show of about 30 minutes.



or

A few minutes practice and the working is mastered. There are no complicated preparations to make—the whole apparatus is simplicity itself. Where no electricity is available a dynamo may be attached which will light the lamp and drive the Projector on turning one handle. This does away with having to recharge or replace batteries.

PATHÉSCOPE FILMS are supplied in three sizes, 30 ft., 60 ft. and 300 ft., which are equivalent, in running length, to 100 ft., 200 ft. and 1000 ft. respectively, of Standard size Cinema Film.

The Pathéscope Film Library contains over 2000 films, embracing every subject and featuring many of the best-known 'Stars.' The 300 ft. (Super) Reels may be hired, at reasonable charges.

By an ingenious contrivance in the Projector mechanism titles on Pathéscope films are held still on the screen. This effects a great economy in the film used and allows a much greater length of PICTURE per reel.

ALL PATHÉSCOPE FILMS ARE GUARANTEED NON-INFLAMMABLE.

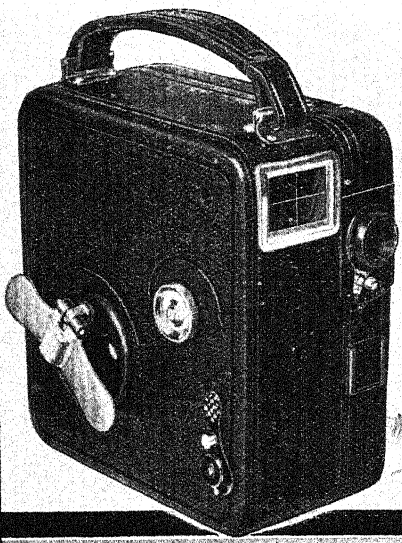




Cameras

PATHÉSCOPE 'MOVIE' CAMERAS embody, in miniature, every essential of the professional apparatus, without any complicated parts. They are 'pocket-size' and wonderfully simple and efficient.

Pathéscope cameras are easier to use than the average snapshot camera. The only adjustment required before filming is that of the lens aperture — then, all that is necessary is to sight your subject and turn the handle or, in the case of the motor-driven models, press the button. The cameras are fitted with fast, fixed-focus lenses (*f*. 3·5) which give amazingly sharp, clear pictures of good depth and definition. There are two models available. The hand-turned camera which has



to be worked from a tripod, but to which an automatic drive can be fitted—or the MOTO-CAMERA, which is an all-enclosed model with automatic drive and other accessories built in.

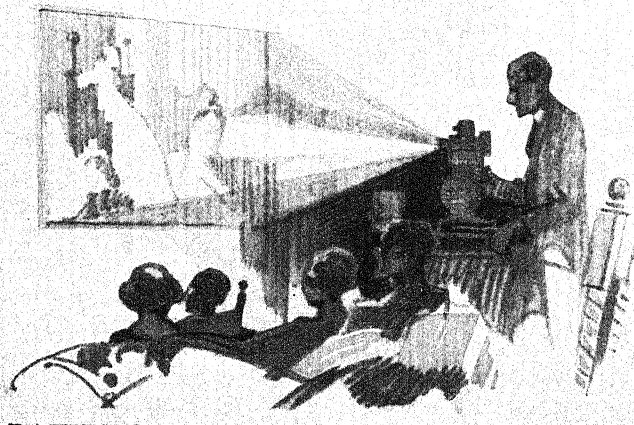
The Films are daylight loading, each reel accommodating over 1,000 separate pictures. The developing process is that known as DIRECT-REVERSAL—the actual film exposed in the camera becomes the positive which is shown on the screen. This eliminates the cost of printing on positive film from negatives, though this may be done if required, in which case a number of copies can be made of the same film. Copies can also be made from a positive film. A thirty-six hour developing service is in operation for processing films, but those who are keen enough may develop their own reels quite easily in our special apparatus.



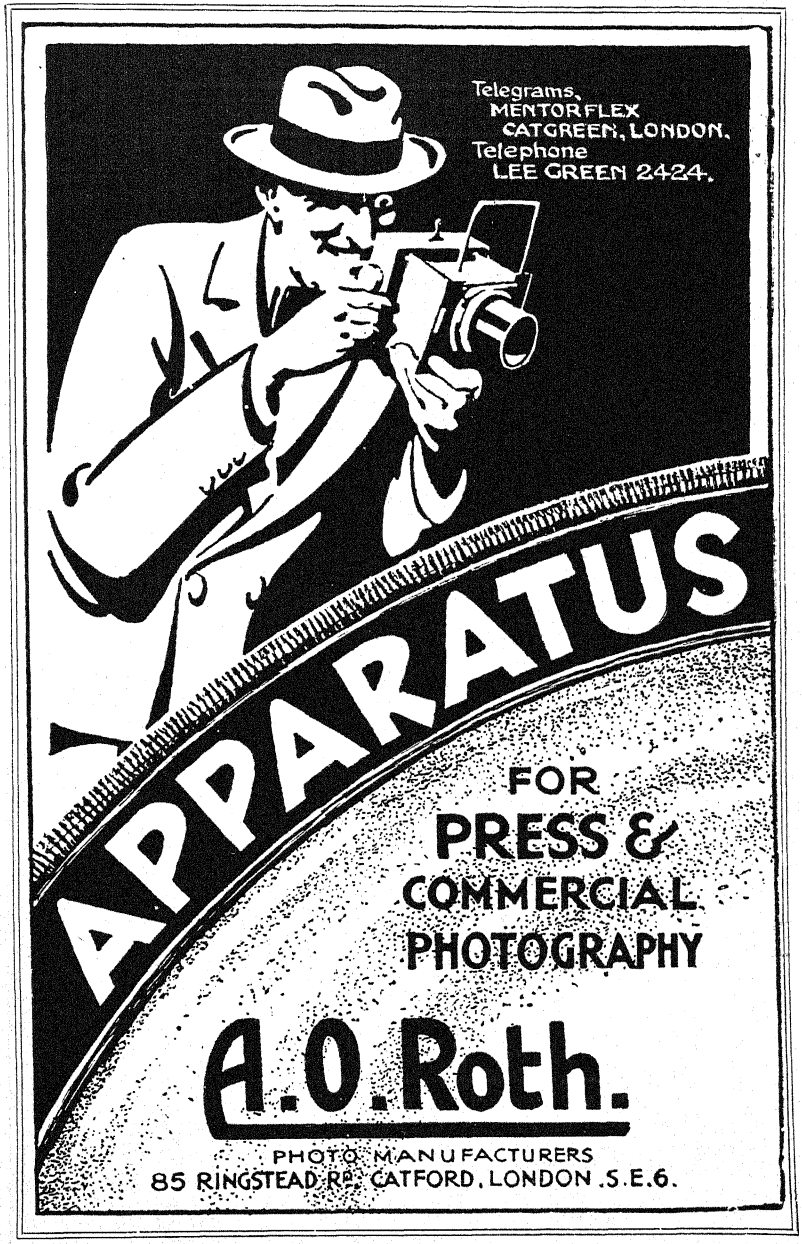
Prices

	£	s.	d.
PATHÉSCOPE PROJECTOR (105-115 volts)	6	0	0
ADDITIONAL RESISTANCE (all other voltages).....		10	0
LIBRARY FILMS, 300 ft., £1.7s. 6d.; 60 ft., 6/-; 30 ft.		3	6
HIRE TERMS FOR 300 ft. reels :—			
12 films in 3 months, £2. 2s. 0d.; 24 films in 6 months	3	10	0
EXTRA ACCESSORIES, IF DESIRED :—			
ELECTRIC MOTOR DRIVE	2	5	0
DYNAMO (where no current is available)	3	10	0
SUPER-ATTACHMENT (for 300 ft. reels).....	2	2	0
PATHÉSCOPE "MOVIE" CAMERA	5	0	0
CLOCK-WORK AUTOMATIC DRIVES ..... from	2	2	0
PATHÉSCOPE MOTOCAMERA (all enclosed)	10	10	0
FILMS .... each		2	7
DEVELOPING (36 hour service) ..... per reel		2	0

PATHÉSCOPE APPARATUS MAY BE PURCHASED ON DEFERRED TERMS IF SO DESIRED.



PATHESCOPE Ltd., 5, LISLE STREET, W.C.2.


Telegrams,
MENTORFLEX
CATGREEN, LONDON.
Telephone
LEE GREEN 2424.
APPARATUS
FOR
PRESS &
COMMERCIAL
PHOTOGRAPHY
A.O.Roth.
PHOTO MANUFACTURERS
85 RINGSTEAD Rd. CATFORD, LONDON .S.E.6.

NEW FOLDING PRESS MODEL NEW

Equipment — MEYER F/3 ANASTIGMAT — Focus 6″

All Metal. ***Light Alloy.***

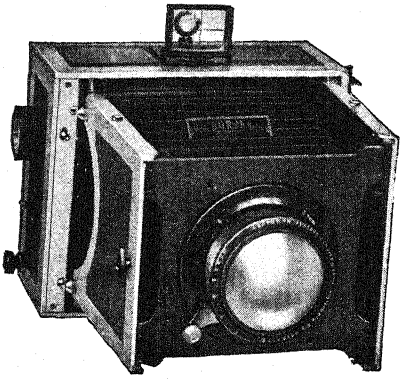
Focal Plane Shutter non-capping.

Variable slits.

Adjustable tension.

Speeds, 1/1300th 1/10th sec.

Double hooded focussing screen.



Dimensions: $6\frac{3}{4}'' \times 5\frac{1}{2}'' \times 2\frac{3}{4}''$

Weight: 4 lbs. 8 ozs. approx.

Price: Complete with 3 Double Dark Slides.

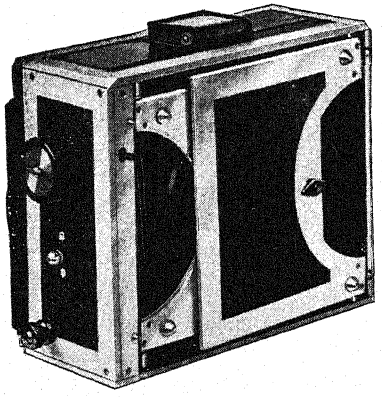
£41 12s. 6d.

MADE ONLY IN 9×12 cm. & $3\frac{1}{4}'' \times 4\frac{1}{4}''$ Sizes.

Lens Protected from All Possible Damage whilst Touring.

Suitable for all Climates. Tropical and Arctic.

Code Word: Halali.



Deep Lens Hood, **9s. 6d.**

Extra Slides, **£1 7s. 0d. each.**

Best English cowhide leather case to take Camera & 6 slides, **£2 15s. 0d.**

Film Pack Adapter, **£1 7s. 0d.**

MEYER WIDE ANGLE ANASTIGMAT, with Attachment and Focussing Device. Focus $3\frac{1}{8}''$ ... ... **£7 10s. 0d.**

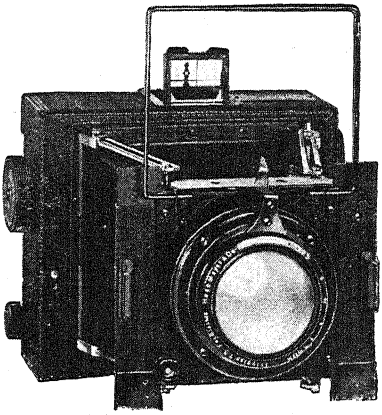
CABLES "Mentorflex Catgreen London"

Sole British Distributor

d. O. Roth

85 Ringstead Road, London S.E.6

TELEPHONE:- LEE GREEN 2424



SUPERSPEED OUTFIT

Meyer F/3 Anastigmat

FOCUS 6″.

THE PRESSMAN'S CAMERA

RIGID COMPACT LIGHT

The most efficient instrument for Sports, Rapid action and all other subjects. New Focal Plane Shutter. Self-capping. Ball and Time Adjustment. Speeds 1/1300-1/10th second. Variable tension.

Exquisite finish. Suitable for all climates. Block form Double Dark Slides.

The Speed of the Meyer F/3 Anastigmat permits of Instantaneous exposures under the **WORST** conditions of lighting.

Excellent for shots of theatrical scenes.

IDEAL FOR "STILLS" IN CINE STUDIOS.

Patent focussing scale on top of camera with large visible figures (yards). Adjustment of focus up to the moment of exposure. Simultaneous control with one eye of Direct vision finder and focussing scale.

PRICES:

Complete with 3 Double Dark Slides. Lens hood. Cable release and top scaling.

Size.	Focus.	Plasmat F/4.	Aristostigmat F/4.	Meyer F/3.	Code Word.
	inch.	£ s. d.	£ s. d.	£ s. d.	
9×12 cm.	6	35 15 0	31 10 0	41 12 6	**Hobbs**
10×15 cm.)	7	42 15 0	40 10 0	52 9 0	**Woolley**
3¼×5½)					
4¾×6½	8½	49 15 0	47 12 0	65 14 0	**Chapman**

Size.	Double Dark Slides. each.	Film Pack Adapter.	Mackenzie Adapter A.	Fitting of Mackenzie Adapter.	Envelopes each	Best English Tan Cowhide Leather Case, take Camera and 6 slides
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
9×12 cm.	1 7 0	1 7 0	2 16 3	0 7 0	0 5 2	2 15 0
10×15 cm.	1 14 0	1 14 0	3 5 3	0 8 6	0 5 5	3 10 0
4¾×6½ ...	2 0 0	2 0 0	3 12 10	0 10 6	0 5 10	4 15 0

CABLES "Mentorflex Catgreen London"

Sole British Distributor

A. O. Roth

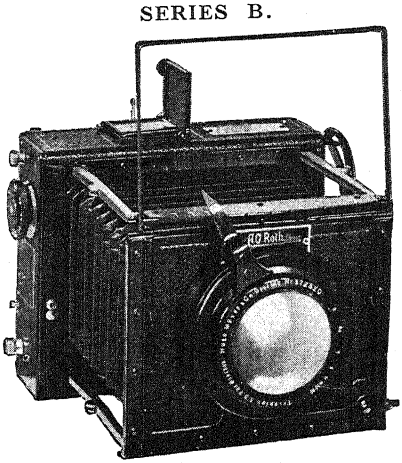
85 Ringstead Road, London S.E.6

TELEPHONE:- LEE GREEN 2424

PRESS FOCAL PLANE OUTFIT

RECOMMENDED FOR FREE LANCE.

SERIES B.



With either Meyer F/3 Anastigmat or Meyer Double Anastigmat Ser. F/4
9 × 12 cm. or $3\frac{1}{4}'' \times 4\frac{1}{4}''$.
Outside dimensions:
$6\frac{1}{2}'' \times 5\frac{1}{2}'' \times 2''$.
Weight: 2 lbs. 15 ozs.
Patent struts. Instantaneous action of opening.

DEAD RIGID.

Patent Self-capping Focal Plane Shutter (silent). Alteration of speeds in any position, before or after setting.

Speeds: 1/1000-1/10th sec. Adjustable tension.

Special device for opening shutter for screen focussing. Double hooded focussing screen. Direct vision frame finder and brilliant finder.

THE PARTICULAR FEATURE OF THE FOCUSSING IS TWO SCALES. ONE ON THE FOCUSSING MOUNT AND ONE FITTED TO THE TOP OF THE CAMERA, with large visible figures (yards).

The adjustment of focus can be made up to the moment of exposure without reversing the instrument. One eye controls scale and direct vision finder simultaneously.

Horizontal and vertical tripod bush.

The instrument is of finest finish, all weather proof. It is supplied in Best English Cowhide leather case, size $8'' \times 3'' \times 11''$, which takes camera and 12 single slides.

PRICES:

SERIES B. Inclusive 12 single slides, deep lens hood. Cable release and leather case.

	£ s. d.	Code Word
9 × 12 cm. ($3\frac{1}{4} \times 4\frac{1}{4}$), fitted Meyer F/3, Anastigmat Focus 6″	**38 10 0**	Jupiter.
$3\frac{1}{2}'' \times 2\frac{1}{2}''$, fitted Meyer F/3, Anastigmat Focus $4\frac{3}{4}''$	**34 0 0**	Saturn.
9 × 12 cm. ($3\frac{1}{4} \times 4\frac{1}{4}$), fitted Meyer Double Anastigmat Series F/4, Focus 6″	**32 15 0**	Bear.
$3\frac{1}{2} \times 2\frac{1}{2}''$, fitted Meyer Double Anastigmat Series F/4, Focus $5\frac{1}{4}''$	**28 10 0**	Minerva.

Extra Single Slides, **3s. 6d. each.** Film Park Adapter, **12s 6d.**

CABLES "Mentorflex Catgreen London"

Sole British Distributor

O. Roth

85 Ringstead Road, London S.E.6

TELEPHONE:- LEE GREEN 2424

Hugo Meyer & Co.

PHOTOGRAPHY OPTICAL WORKS CINEMATOGRAPHY



THE CAMERA for the MODERN PORTRAIT STUDIO

Solves the difficult problem :: of CHILD STUDIES ::

Instantaneous Exposures with Moderate Lighting

SPECIAL REFLEX

PLASMAT F/1·5 **FOCUS 3½″**

Plate size 4½×6 cm. (1⅞″×2⅜″).

Specification : Double extension. Rack and pinion movement, with lock adjustment. Micro Lens mount focussing from infinity to "close-ups" 10″ from Camera.

Revolving back. Back focussing screen. Deep top focussing hood. Spring raised mirror. **No jar.**

Patent Focal Plane Shutter, self-capping. Speeds 1/1000-1/10th sec. Ball and Time. Hand and Cable release. Alteration of slit in any position.

With this instrument the most impossible subjects can be shot under all conditions of lighting.

Instructive booklet dealing with Camera and how to make enlargements up to any size, supplied free on purchase of camera.

PRICES.

	£	s.	d.
Camera complete with three nickel double bookform slides, suitable for Autochrome plates	60	8	0
Extra double slides ... ... each	1	5	0
Special Film Pack Adapter to suit D.D. Slides ...	1	2	0
Deep Lens Hood	0	9	6
Best Tan Cowhide Leather Case, velvet lined to take outfit	1	18	0
Focussing Magnifier to fit in hood	1	5	0
Optical Worked Filter for Panchromatic Plates ...	1	14	0

Code Word : Mars.

CABLES "Mentorflex Catgreen London"

Sole British Distributor

d. O. Roth

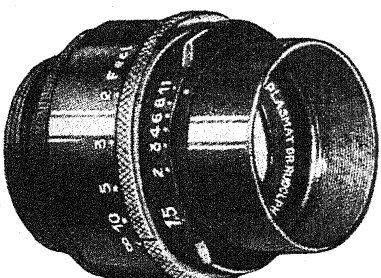
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Hugo Meyer & Co.

PHOTOGRAPHY OPTICAL WORKS CINEMATOGRAPHY

KINO PLASMAT F/1.5



Complete Anastigmatic Correction

Patent Dr. P. Rudolph. (Angle 90.)

WIDER ANGLE.
BETTER PERSPECTIVE
MORE REALISTIC
SCREEN RENDERING.

CRITICAL DEFINITION.

The Ideal Instrument for Cine Cameras.

PROFESSIONAL and AMATEUR.

Atmospheric perspective imparts that quality to a picture which, with objects placed one behind the other, gives the eye a convincing impression of space between them. The **PLASMAT** accomplishes this.

Those who in recent years have studied film production must have noticed the astonishing realistic effect. Such famous films as the Nibelung, etc., have been produced with the aid of the Plasmat.

Kino-Plasmats are supplied in Micro Focussing mount and can be fitted to most of the modern professional and amateur Cine Cameras.

For Bell Howell, Filmo, Victor, De Vry, and Kodak B, special Model, etc. In Micro-Focussing Mount, Interchangeable with lens usually supplied.

For 16 m/m Film.

Focus.	£	s.	d.
¾ in.	12	0	0
⅞ in.	12	10	0
1 ins.	15	10	0

For Standard Film (Professional).

Focus.	£	s.	d.
1⅝ ins.	19	0	0
2 ins.	21	0	0
3 ins.	25	0	0
3½ ins.	33	5	0

For Pathe Moto Camera. Plasmat F/2. Focus ⅞". Inclusive fitting and special diaphragm scale incorporating hood, **£12 0s. 0d.** Camera must be sent for fitting to address below:

CABLES "Mentorflex Catgreen London"

Sole British Distributor

d. O. Roth

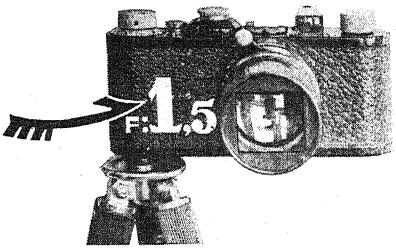
85 Ringstead Road, London S.E.6

TELEPHONE:- LEE GREEN 2424

Hugo Meyer & Co.

PHOTOGRAPHY OPTICAL WORKS CINEMATOGRAPHY

Multi Exposure Focal Plane Camera



Negative 1″×1½″. Enlarges up to 12×10.

DAYLIGHT LOADING.

One load = 36 exposures.

Takes Standard Cine film.

Weight, 1 lb. 6 ozs.

Size, 5½×2½×1¼″.
(Without lens projection.)

Shutter speeds :
1/500 — 1/20th and Time.

Price £39 0s. 0d. complete with 3 Spools = **108 Exposures.**

Leather Case to take Camera and six spools, **£1 5s. 0d.**

Three spools of film in tin container = 108 exposures, **7s. 6d.**

Code Word : Speedex.

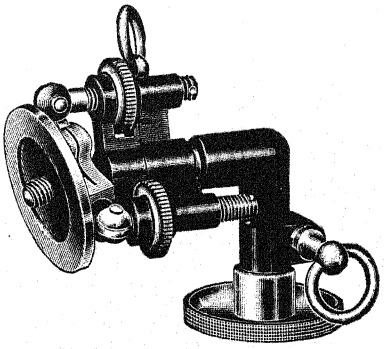
UNIVERSAL TRIPOD HEAD

For Amateur Cine, Stand and Hand Cameras (suitable up to ½ plate).

VERY RIGID.

Machined out of solid brass, nickel plated. Camera can be adjusted to any angle, up and down, turntable movement, horizontal and vertical. **ELBOW** removable.

Locking device absolutely secure.



Price 15s. 6d.

When ordering state if required for Continental (⅜″) or English bush (¼″ Whitworth).

Code word : Stable.

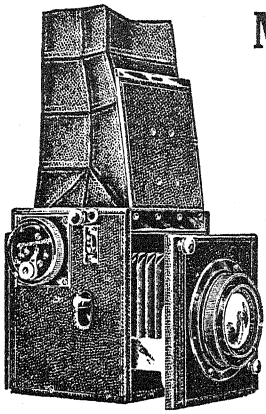
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Sole British Distributor

A. O. Roth

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TELEPHONE :- LEE GREEN 2424



MINIATURE REFLEX

4½ × 6 cm.

Outside Dimensions 3¾″ × 3½″ × 3½″.

Weight, 24 ozs.

Fitted MEYER F/3 ANASTIGMAT FOCUS 3½″.

A High-class Instrument with all movements. Double extension. Rack and Pinion. Allowing for "close-ups" 12″ from Camera.

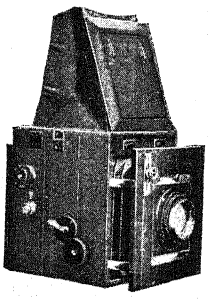
Rising front. Micro focussing adjustment on lens mount. Patent self-capping shutter. 1/1000-1/10th sec. Ball and Time. Revolving back. Hand and Cable Release. Tripod Bush. Deep Reversible top focussing hood. Full size square ruled top focussing screen.

THE SMALLEST AND LIGHTEST HIGH-CLASS REFLEX ON THE MARKET.

	£	s.	d.
PRICE: With six single slides	**32**	**0**	**0**
Film Pack Adapter	**0**	**18**	**6**
Deep Lens Hood	**0**	**9**	**6**
Best English Cowhide Case to take Outfit	**1**	**7**	**6**
Extra Single Slides ... ... each	**0**	**3**	**0**
Panchromatic Filter	**1**	**2**	**0**
Telephoto attachment: 4x, 5x and 6x magnification	**12**	**10**	**0**

Code Word: **Goblin.**

Also made in 3½ × 2½ and 3¼ × 4¼ sizes.



PRIMAR DOUBLE EXTENSION REFLEX

Strong four strut extension construction.

Absolute rigidity and parallelism of front guaranteed.

Interchangeable lens panels.

Self-capping shutter. Speeds, 1/1300—1/10th. Time and brake adjustment with slow speeds, 1 sec. Spring raised mirror, no jar. Revolving back.

Best finish in Morocco Leather. Block form Double Dark Slides.

PRICES:

	Plasmat F/4.	Focus.	Meyer F/3 Anastigmat.	Focus.
9 × 12 cm. ...	**£52 15s. 0d.**	7″	**£53 10s. 0d.**	7″
3¼ × 4¼ ...	Code Word: **Pantex.**		Code Word: **Wolfex.**	
4¾ × 6½″ ...	**£66 10s. 0d.**	9½″	**£71 0s. 0d.**	10″
	Code Word: **Rautex.**		Code Word: **Whatex.**	

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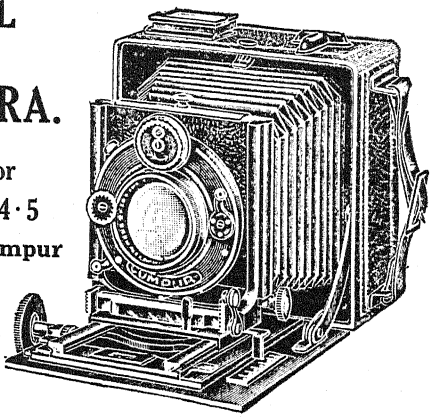
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UNIVERSAL
(3 Foci)
SILAR CAMERA.

ALL METAL.



PLASMAT F/4 or PLASMAT SET F/4·5
in the well-known Compur Shutter.

TRIPLE EXTENSION.

Revolving Back. For hand or stand use. Extreme rise provided for Wide Angle work. Swing front, drop base and cross movement.

All movements incorporated which are so essential to the practical worker. Two Tripod Bushes. One in normal position when using single extension. One forward when using extreme extension. Perfectly balanced.

Interchangeable lens panels for use with different lenses.

The whole outfit is of finest precision.

In the **PLASMAT SET** the lens cells are bayonet mounted. One half turn removes or secures the lens to the shutter.

Focal Plane shutters quoted for on request.

PRICES. Including 3 Single Slides (non-corroding).

Plate Size.	Plasmat F/4. Focus Double Lens.	Plasmat F/4. Focus Single Lens.		Plasmat Set F/4.5. Focus Double Lens.	Plasmat Set F/4.5. Focus Back Lens.	Plasmat Set F/4.5. Focus Front Lens.		Weight. lbs. ozs.		Leather Cases, Cowhide. Velvet Lined.
	Ins.	Ins.	£ s. d.	Ins.	Ins.	Ins.	£ s. d.			£ s. d.
4½ × 6 cm.	3	4⅜	24 9 6	3 1/16	4⅜	6½	23 7 0	1	1	0 17 6
3½ × 2½″	4¼	6⅜	27 16 9	4 5/16	6⅝	9 1/16	27 0 0	2	4	1 5 0
½ pl. 9 × 12 cm.	6	9⅝	38 10 0	6	8⅝	12⅝	37 11 0	3	1	1 15 0
10 × 15cm.	7	12	46 5 6	6¾	9⅞	14¼	41 8 0	4	3	2 2 0
13 × 18cm. 5 × 7″	8¼	13½	57 17 9	8¾	12⅝	18½	54 10 0	5	11	2 18 0

Meyer Wide Angle F/9. Focus 3.1/8 in. in Compur Shutter with spare panel, suitable for cameras up to 10 × 15 cm. ... ... **£7 14s. 0d.**

Meyer Wide Angle F/9. Focus 4 in. in Compur Shutter with spare panel, for 13 × 18 cm. Camera ... ... **£7 19s. 6d.**

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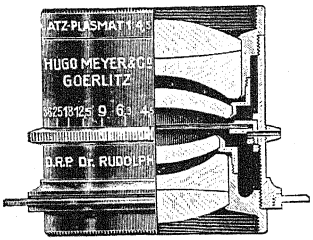
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MEYER PLASMAT F/4

Patent Dr. P. Rudolph. *(Angle 90°.)*

SPHERO-ACHROMATIC ANASTIGMAT.

Complete correction for the Spectrum.

COMBINABLE.

The **Plasmat** gives that natural atmospheric perspective and convincing plasticity. Perfect reproductions of light and shade in the gradations actually existing. Extraordinary covering power.

THE 7″ PLASMAT COVERS 7″ × 7″ SQUARE FOR AIR SURVEY.

The Plasmat is the best possible lens obtainable for **Studio, Outdoor, Colour Photography, etc.**

The single components are fully corrected Anastigmats and give excellent results as Long Focus Lenses.

FOCI from 2·1/8″—19″.

All Previous Prices Cancelled. **PRICES.** All Previous Prices Cancelled.

Combined Focus.	Single Component.	Standard Mount. £ s. d.	Sunk Mount. £ s. d.	Plate Covered.	Code Word. St. Mt.	Code Word. Snk. Mt.
Inches.	Inches			Inches.		
6½	10⅝	16 10 0	17 10 0	5½ × 4	Pagina	Pascha
7	12	21 0 0	22 0 0	6 × 4 (10 × 15 cm.)	Pagus	Papius
7½	12⅝	22 10 0	23 10 0	6½ × 4¾	Paka	Passir
8¼	13¼	25 0 0	26 10 0	7 × 5	Paladin	Pastete
9½	16	36 0 0	38 0 0	8 × 5	Palar	Papiros
10⅝	17¾	43 0 0	—	8½ × 6½	Palette	—
12	19¾	52 0 0	—	9 × 7	Palki	—
14¼	23⅝	72 0 0	—	10 × 8	Pallas	—

MEYER F/4 PLASMAT SET

Combined Focus.	Single Components. Front lens.	Single Components. Back lens.	Standard Mount. £ s. d.	Sunk Mount. £ s. d.	Plate Covered.	Code Word. St. Mt.	Code Word. Snk. Mt.
Inches.	Inches.	Inches.					
6½	12	9⅞	18 10 0	19 10 0	5 × 4	Rudis	Rense
7¾	13¼	12	23 0 0	24 10 0	6½ × 4¾	Rudolf	Ribes
8¾	16	12⅝	29 10 0	31 10 0	7 × 5	Rufach	Richte
10⅝	19¾	16	44 0 0	—	8½ × 6½	Rufu	—
13	23⅝	19¾	62 0 0	—	10 × 8	Ruki	—

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DOUBLE ANASTIGMAT

SERIES F/6.8

CEMENTED CONSTRUCTION. SYMMETRICAL DESIGN. COMBINABLE.
(No Air Space.)

ANGLE 90°

FOR COMMERCIAL PHOTOGRAPHY, REPRODUCTION, TECHNICAL AND SCIENTIFIC WORK, Etc.

Where speed is not required but the most critical definition is essential.
Perfect uniform illumination and definition to the edges of the plate.
The circle of illumination exceeds the plate size considerably.
In all cases the longest possible focus should be selected to obtain perfect modelling and correct perspective.
This lens covers, stopped down, a considerably larger plate size than that given here.

RECOMMENDED FOR THREE & FOUR COLOUR PROCESS WORK

The Single Components give perfect Definition as Long Focus Lenses. The focal length being nearly double that of the combined lens.

IN FOCI from 1.5/8″—30″.

Focus. Inches.	Standard Mount. £ s. d.	Sunk Mount. £ s. d.	Covers. Inches.	Code Word. Stand Mt.	Sunk Mt.
6½	8 10 0	9 0 0	6½ × 4¾	Vaida	Dank
8½	14 0 0	14 10 0	8½ × 6½	Vallid	Darm
10¾	20 0 0	—	10¾ × 8½	Vampir	—
12	25 0 0	—	12 × 10	Vanad	—
14	30 10 0	—	14 × 12	Vanloo	—
16½	40 0 0	—	16 × 12	Vapeur	—
19	52 0 0	—	17½ × 16	Varazze	—
24	70 0 0	—	24 × 20	Valpo	—
30	95 0 0	—	28 × 22	Varde	—

EXPORT PRICES : For the British Colonies and places outside the United Kingdom the prices are subject to a discount of 25 per cent.

All goods are re-insured with Lloyds for all risks. 10s. per £100.

Packing and Freight at nett cost.

Remittance must accompany order to save delay.

In case of damage to goods the Local Representative of Lloyds must be informed immediately and a Certificate of Survey forwarded to address below :

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Sole British Distributor

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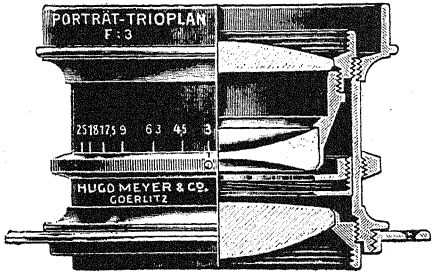
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F/3 PORTRAIT TRIOPLAN



SPECIAL ANASTIGMAT WITH EXCELLENT CORRECTION.

DESIGNED FOR THE PORTRAIT SPECIALIST.

EXQUISITE MODELLING. BRILLIANT NEGATIVES.

FINEST DETAIL

MANY IN USE IN UP-TO-DATE STUDIOS.

ADMIRABLE FOR CHILDREN & PORTRAITURE IN HOME SURROUNDINGS INSTANTANEOUS EXPOSURES WITH MODERATE LIGHTING. INVALUABLE TO THE PROGRESSIVE ARTIST WITH IDEAS.

The finest instrument in conjunction with the **Studio Reflex.**

Mounted in Standard Iris mount with projecting hood to fit if necessary Central or other Studio Shutters.

Focus.	Standard Mount.	Spare Flange.	Suitable for	Code Word.	Silent Central Shutter for Front.
Inches.	£ s. d.	£ s. d.	Inches.		£ s. d.
10½	30 0 0	0 12 0	7 ×5	Watt	2 12 0
12	36 0 0	0 16 0	8½×6½	Wage	3 4 0
14	50 0 0	1 0 0	8½×6½	Wagner	3 16 0
16½	65 0 0	1 4 0	10×8	Walkure	5 0 0
19	85 0 0	1 8 0	10×8	Waffe	5 10 0

PROFESSIONAL PRIMAR FIELD CAMERA

Brass Bound. Substantially made in Mahogany. Suitable for Studios and Field Use.

DOUBLE EXTENSION.

PRICES, including 3 Brass Bound Double Dark Slides, Bookform.

Sizes.	£ s. d.	Sizes.	£ s. d.
4¾×6½ins.	15 5 0	6½×8½ (1/1 pl.)	21 10 0
5 ×7 "	15 5 0	10×8	34 0 0
(13×8 cm.)		12×10	48 0 0

CABLES "Mentorflex Catgreen London"

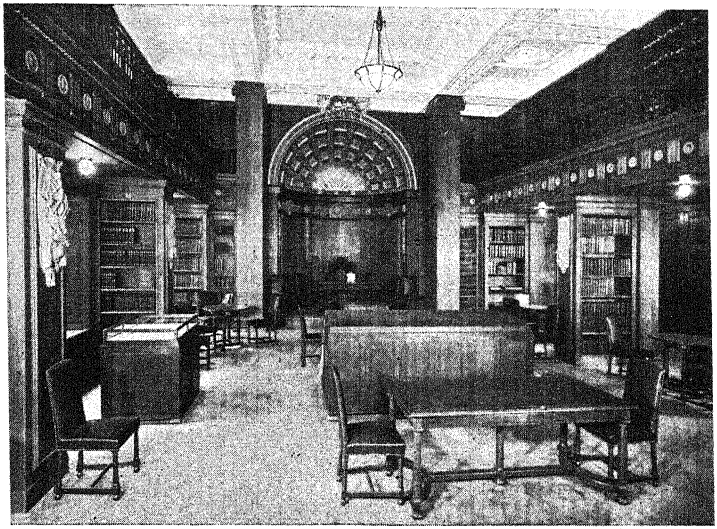
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Meyer Wide Angle Aristostigmat F/9. Angle 100°



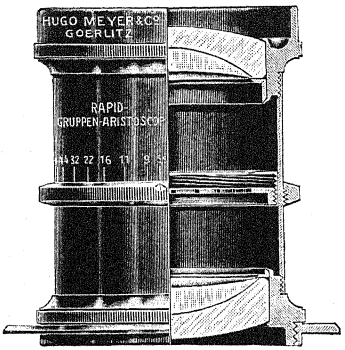
Gives Critical Definition at full aperture F/9.
Fast enough for Instantaneous exposures.
Supplied in cells to fit Compur Shutters, interchangeable with customers' own lenses.
When ordering state number of Shutter or diameter of lens cell.

Focus.	Standard Mount.	In screw cells complete with case and focussing scale.	Complete with Compur Shutter.	Covers plate at full aperture up to
Inches.	£ s. d.	£ s. d.	£ s. d.	
3½	4 6 0	4 6 0	7 14 0	10 × 15 cm.
				3½ × 5½ in.
4	4 13 0	4 13 0	7 19 6	4¾ × 6½ in.
4¾	4 16 0	4 16 0	8 3 0	6½ × 8½ in.
5¼	5 6 6	5 6 6	9 7 0	6½ × 8½ in. with full rise
6¼	6 6 6	6 6 6	10 7 0	10 × 8 in.
7	7 5 0	7 5 0	11 6 0	10 × 8 in. with full rise
7⅞	9 14 0	9 14 0	14 6 0	12 × 10 in.
9½	11 13 0	11 13 0	16 4 6	12 × 10 in. with full rise
10¾	15 10 6	15 10 6	20 14 0	15 × 12 in.

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Rapid Group Aristoscop F/5·5

A high-grade Studio Objective of proved value in all classes of work.

Admirable for Portraits and Groups.

Jena Glass. Angle of view about 60°.

These Lenses are of Aplanatic construction and free from distortion.

The Modelling, depth, definition and brilliancy obtained in the negatives are of the highest standard.

The large aperture allows for rapid portrait exposures in the studio and instantaneous work outdoors.

No.	Equivalent focus.	Diameter of lenses.	Plate covered with		With iris diaphragm. Price.	Code word.	Extra flange.
			Medium stop	Smallest stop			
	inches.	inches.	inches.	inches.	£ s. d.		£ s. d.
1	4¾	⅞	3¼ × 2⅜	4¾ × 3½	6 2 6	Cadre	0 3 6
2	5½	1⅛	3½ × 2⅝	5 × 4	7 8 6	Calvin	0 4 0
3	6¼	1¼	4¼ × 3½	6½ × 4¾	8 9 0	Cargo	0 4 6
4	7⅛	1⅜	5 × 4	7 × 5	9 0 0	Carmen	0 5 0
5	8¼	1½	6½ × 4¾	8½ × 6¼	9 5 0	Carlos	0 5 6
6	9½	1¾	7 × 5	9¼ × 7	10 14 6	Carton	0 6 6
7	10¾	1⅝	8¼ × 6½	10 × 8	11 6 6	Cedrat	0 7 6
8	12	2⅛	9¼ × 7	12 × 9½	14 1 6	Celten	0 8 0
9	14	2⅜	10 × 8	14 × 12	17 9 0	Cerin	0 10 0
10	18	3	12 × 9½	16 × 12	30 2 6	Cerat	0 13 6
11	22	3⅝	16 × 12	20 × 16	42 15 0	Censur	0 18 0
12	26	4¼	20 × 16	24 × 20	67 10 0	Cikade	1 2 6

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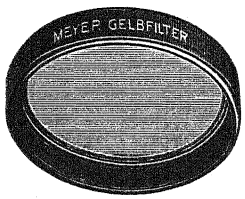
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MEYER LIGHT FILTERS

are essential for Landscapes, Mountain, Sea and Woodland scenes, etc., to compensate for the great contrasts of light and shade, and to reproduce the correct tone values.

These Filters are made of the finest Optical Jena Glass, are tinted scientifically and spectroscopically tested.

Quality A is of the high-grade tinted Glass carefully polished, parallel plano surface.

Quality B is of special Jena Glass optically worked.

Quality C is constructed according to the scientist Dr. Freiherr von Hubl, and consists of dyed gelatine between two plano glass discs.

Quality D is a special Filter for Autochrome Colour plates.

These Filters are supplied in mounts to screw into Lens cell or to slip on.

When ordering state diameter of lens cell for slip on mount. Screw mounts only supplied to lenses of Meyer manufacture.

PRICES.

Diameter.	Quality A.	Quality B.	Quality C.	Quality D.
Inches.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Up to 19/20 ...	0 6 9	0 16 0	0 11 6	0 11 6
1 to 1 1/8 ...	0 9 0	0 18 0	0 13 6	0 13 6
1 1/8 to 1 9/16 ...	0 11 6	1 2 6	0 18 0	0 18 0
1 9/16 to 2 ...	0 12 6	1 14 0	1 7 0	1 7 0
2 to 2 3/8	0 13 6	2 5 0	1 14 0	1 14 0
2 3/8 to 2 3/4 ...	0 15 0	2 16 6	2 5 0	2 5 0
2 3/4 to 3 1/8 ...	0 18 0	5 1 0	4 10 0	4 10 0
3 1/8 to 3 9/16 ...	1 7 0	6 4 0	6 4 0	6 4 0
3 9/16 to 3 15/16 ...	1 16 0	7 7 0	6 15 0	6 15 0

Filters A, B and C are supplied in three grades :—

LIGHT 5 X. MEDIUM 10 X. DEEP 20 X.

HAZE Filters for Air Survey to special quotation.

Every experienced Photographer and Cine Worker should possess several Filters of different depths of colour.

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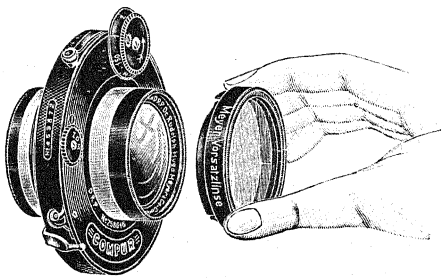
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SUPPLEMENTARY LENS ATTACHMENTS

For increasing or decreasing the focus of Photographic Lenses.



Invaluable on the Hand Camera.

Focal length of lens without Attachm. Lenses	Attachm. for increasing focal length Ser. I. resulting focal length.	Ser. II. resulting focal length.	Reducing Attachm. Ser. III. Resulting Focal length.	Prices. Attachm. Lenses in slip-on mounts. F6.8-F6.3	F6.-F5.5	F4.5
Inch.	Inch.	Inch.	Inch.	£ s. d.	£ s. d.	£ s. d.
3	3	5½	2⅜	0 10 0	0 10 0	0 10 0
3½	4¼	6¾	2¾	0 10 0	0 10 0	0 10 0
4¼	5⅛	8	3⅛	0 10 0	0 10 0	0 10 0
4¾	6¼	9	3½	0 10 0	0 10 0	0 12 0
5¼	7	10	4	0 10 0	0 12 0	0 13 0
6	8	11¼	4 5/16	0 12 0	0 13 0	0 15 6
6½	8¾	12⅛	4¾	0 13 0	0 13 0	0 15 6
7	9½	13½	5⅛	0 13 0	0 15 6	0 17 0
7¾	10¼	15	5½	0 15 6	0 17 0	0 17 0
8¼	11	16	6	0 15 6	0 17 0	1 1 0
Exposure required	2×	4×	6×	that of the ordinary lens		

Attachment lenses Series I and II are fitted to the front lens.
Attachment lenses Series III are fitted to the Back lens.

When ordering please give the following information :
1. Outside diameter of the front or back lens mount.
2. Focal length and F value (rapidity) of lens for which the attachment is required.
3. Total extension of camera.

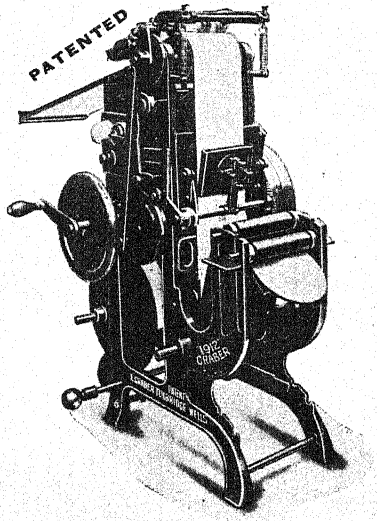
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THE IMPROVED

"1912 GRABER"

COMBINED AUTOMATIC EXPOSING, TYPE-PRINTING, AND CUTTING MACHINE

For Bromide and Gaslight Postcards and Paper



This Machine is easily worked by unskilled labour, hand or power, and is fitted for Gas or Electric Light, for any make of Bromide or Gaslight paper or card.

1500 POST CARDS in EACH HOUR

from one Negative (either glass or film) can be easily Exposed, printed on the reverse side from Type, and including any Imprint; also cuts in convenient lengths from the Reel, all in one operation for hand developing.

THE LENGTH OF EXPOSURE IS EASY OF ADJUSTMENT

to suit any density of Negative in a few seconds.

Changing of negative almost instantaneous. Patent Ingenious Mask Negative Carrier which dispenses with old and troublesome methods.

Every Photographer, Printer or Stationer may become his own publisher by using my machines.

THE GRABER FAMOUS MACHINERY

Embodies all improvements which have suggested themselves as being desirable, and in their present form represents the most perfect and practical machines now on the world's markets, for Photo Contact Printing, Developing, Fixing, &c. and Drying, in one working.

Please write for fuller particulars and New Illustrated Booklet with Testimonials and Samples of Work, to :—

☞ THE PATENTEE AND SOLE MANUFACTURER

ELLIS GRABER, TUNBRIDGE WELLS, ENGLAND.

Established in the year 1900.

Supplied to about 25 countries, and the British, American, Italian and Chilean Governments.

STILL ABSOLUTELY IT!

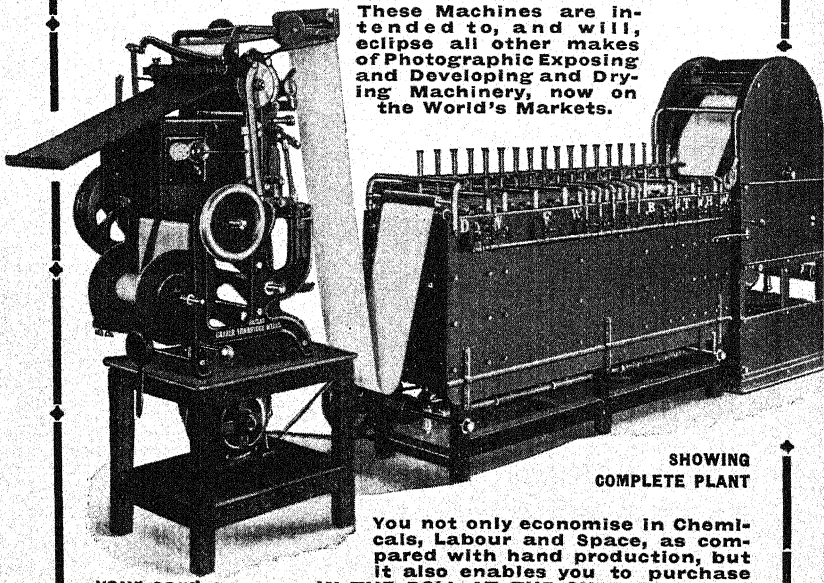
For producing the Finest Quality Bromide and Gaslight Real Photographic Productions and Postcard Printing, Developing, Fixing, Bleaching, Toning, Hardening, Washing and Drying; also Type Printing, simultaneously on reverse side of Picture, all in one rapid automatic operation.

The GRABER PATENTED PLANTS

WITH OVER 20 YEARS' EXPERIENCE PUT INTO THEM

are the only MACHINES THAT WILL DO THIS

These Machines are intended to, and will, eclipse all other makes of Photographic Exposing and Developing and Drying Machinery, now on the World's Markets.



SHOWING COMPLETE PLANT

You not only economise in Chemicals, Labour and Space, as compared with hand production, but it also enables you to purchase your card or paper IN THE ROLL AT THE CHEAPEST RATE. This will very soon pay for machine.

THE "ACME" PRINTING MACHINE (Patented) Exposes from Negatives and Type prints on the reverse side of the picture, and automatically registers number of exposures. Also will cut off for hand developing.

THE "IMPROVED IDEAL" DEVELOPING MACHINE (Patented) Develops, Rinses, Fixes, Washes, Bleaches, Rinses, Tones, Rinses, Hardens and finally Washes.

THE "ECLIPSE" NEW DRYING MACHINE (Patented) finally dries the work after washing and automatically re-reels or the card can be cut.

Net Weight of "Acme," "Ideal" and "Eclipse" is about 17 cwt.
Floor space for the complete plant is approximately 17 ft by 3 ft.
Power: The whole three Machines are driven by 1-h.p. motor.

E. GRABER *Specialist in Automatic Photographic Plant and Machinery.*

E.G.'s Machinery is known all over the world as the only Practical and Recognized Machinery that can produce

PERMANENT PHOTOGRAPHIC WORK.

These Machines produce work which is sharp and refined, and a reliable Contact Printing of a high-class character.

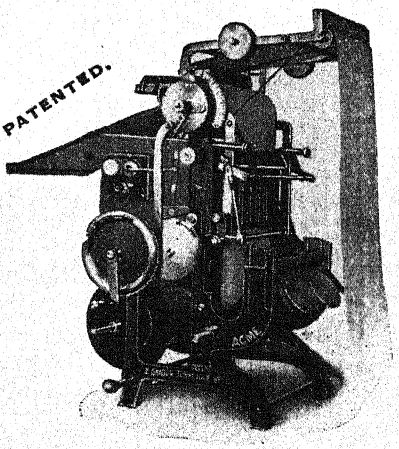
E.G.'s Machines must not be confused with those which are MERE Toys periodically advertised and boomed under various camouflaged fancy names, the reason for so doing being best known to the makers and their agents.

The GRABER Machines have always been of All-British Manufacture, and have the reputation of always being known by the ONE name of "The Graber Machines."

The GRABER "ACME"

IS A RAPID ROTARY QUADRUPLE EXPOSING, TYPE-PRINTING and CUTTING MACHINE, and is SUITABLE for POST CARD and ALL-ROUND WORK,

Embodies the Latest and Up-to-Date Labour-saving developments of the Automatic Exposing, Type-Printing (on the reverse side) and Cutting-off Machine for High-Grade Bromide and Gaslight Photographs, with great speed, at minimum cost, by unskilled labour, at one and the same operation, and is the very latest design.



Any make of Bromide or Gaslight Paper or Card may be used.

Meets a long felt want. A productive necessity.

Designed for

Pictures 9 x 11 in.; or 1 or 4 Postcards;

Or a number of Negatives. The size of Pictures can be altered from 3 in., varying by ¼ in. up to 9 in. without waste. Will also cut off Post Cards in Sheets of Six Cards (10½ in. by 11 in.) or Twelve Cards (21 in. by 11 in.).

Also to order, this model can now be adapted to

MEET THE AMERICAN DEMAND TO PRINT AND CUT PICTURES UP TO 11×14.

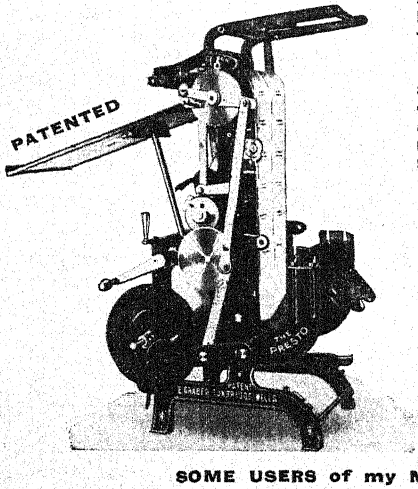
A Large Output at a Minimum Cost.

Will expose from two ordinary Post Card Negatives and Type-print on the reverse side of the Card, from 3,000 to 4,000 per hour; or Expose from four Post Card Negatives, 6,000 to 8,000 per hour.

"THE PRESTO" (GRABER'S)

AUTOMATIC POST CARD TYPE PRINTING & CUTTING MACHINE FOR SENSITIZED CARD MAKERS. Cuts in strips of 6's, or singly.

THE MACHINE IS SIMPLICITY. A BOY OR GIRL CAN WORK IT.



Is designed to print from the roll, and to produce 3,000 to 4,000 Post Card Headings per hour, from two blocks, placed side by side, with Publishers' imprints as required, and works from 11 in. roll, or 2 rolls 5½ in. Imprints are easily changed. The machine cuts off automatically Post Cards in strips of 6's or 12's or singly. After printing 6, a patent automatic movement allows a gripping edge of ¼ in. at top or at bottom, viz., 21½ ins. or ½ in. at top and ¼ in. at bottom, viz., 22 in. when required. A patent impression bed and Type Chase facilitates a quick make ready. Works accurately by hand or power, minus a skilled operator.

SOME USERS of my MACHINES.

Acme Photo Co., Norfolk, U.S.A.
*The Aerial Photo Co., Peterborough.
Aurelio Loyo, Orizaba, Mexico.
*W. & T. Avery, Ltd., Birmingham.
*American Photo Supply Co., Mexico.
Bagshaw & Co., Doncaster.
Brandt & Co., Kristiania.
Bells Photo Co., Ltd., Leigh-on-Sea.
*Bromo Photo Co., Ltd,, Lewisham.
J. F. Carrie, Carpentras, France.
Antonio Cortinas, Havana, Cuba.
Criterion, Ltd., Birmingham.
*W. T. Cook, Upper Caterham.
C. H. Davis, New York.
Dorrett & Martin, London.
Fernandez & Carboneli, Barcelona.
Francisco I. Ferrando, Veracruz.
Etienne Franck, Ghent.
A. Garriga, Barcelona.
L. Gevaert & Co., Antwerp.
*Graphic Times Sun Co., Tokyo.
*Fred Hardie, Aberdeen.
*Harvey Barton & Sons, Ltd., Bristol.
Byron Harmon, Banff, Alberta.
S. J. Hayward, Montreal.
*Ilford, Ltd., Ilford.
Jarroid & Sons, Norwich.
W. N. Jennings, Philadelphia.
*Judges, Ltd., Hastings.
R. Johnston & Son, Gateshead.
*Kodak, Ltd., London.
*Kosmos Photographics, Ltd., Letchworth
S. Kuwada & Sons, Osaka, Japan.
* REPEAT ORDERS.

W. Harrison Lee, Australia.
S. T. Leigh & Co., Sydney.
Levson, Ltd., Johannesburg.
Lida & Co., Tokio, Japan.
Jno. N. Lightbourn, Danish W. Ind'es
Lilywhite, Ltd., Halifax, England.
Lyall Photo Co., Ltd., Winnipeg.
Geo. Lykides, Salonica, Greece.
*Marshall & Co., Nottingham.
R. Muller, Bohemia, Austria-Hungary.
D. A. McCann, Cork, Ireland.
*National Photograph Co., Chicago.
Hugh & G. K. Neill, New Zealand.
*Enrique H. Ortiz, Habana, Cuba.
*Paget Prize Plate Co., Watford.
Pesha Art Co., Marine City, U.S.A.
Photochrom Co., Ltd., Tunbridge Wells
J. K. Piggott, San Francisco.
*Stadler Photographic Co., Chicago.
Stadler Photographic Co., New York.
*Rotary Photo Co., Ltd., West Drayton.
Societa Italiana "Gyska," Rome.
Strains, Ltd., Winnipeg.
Shunker Das & Co., Lahore, India.
*Scholastic Souvenir Co., Blackpool
*The Gowen Sutton Co., Vancouver.
The Little Art Shop, Woodstock, N.Y.
*Valentine & Sons, Ltd., Dundee.
*Ventori, Bologna, Italy.
Vickery Bros., Ilfracombe.
J. T. Walsh, Sydney, Australia.
Wellington & Ward. Ltd., Elstree.
*West-Dempster, Co., Grand Rapids, Mich.
AND MANY OTHERS.

Announcing the new

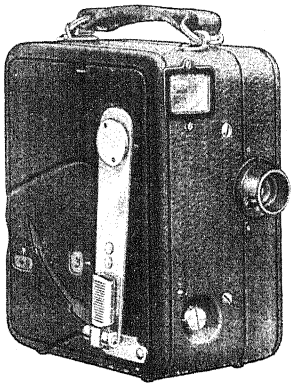
Zeiss Ikon KINAMO S 10

for 16 mm. CINE FILM (daylight loading)

THE WORLD'S SMALLEST CINE CAMERA

❖ ❖

THE introduction of the **Kinamo S 10** inaugurates a new epoch in Amateur Cinematography. In regard to workmanship, simplicity of manipulation, pleasing design and optical equipment, the **KINAMO S 10** has no near cousins. A standard has been set which will be difficult to improve upon.



The salient features of the **S 10 KINAMO** can be summarized as follows:—

1. **Extreme compactness.** Dimensions are only 4¼" × 3⅛" × 2⅜"; weight about 2 lbs. Therefore it is the **world's smallest Cine camera.**

2. **Exposure is automatically** effected by a new pattern governor-controlled clockwork motor, which will expose 13 feet of film with one complete winding.

3. The **films—32 feet in length**—(equal to 80 feet ordinary film) are supplied in light-tight boxes, which are **inserted into the camera with the same ease as loading an ordinary roll film camera.**

4. The **exposed film is returned to your dealer for development,** and in a few days you receive it back as a positive, ready for showing in any 16 mm. projector, **without extra charge.** (A Zeiss Ikon projector is in course of preparation.)

5. The **lens,** a **ZEISS TESSAR working at F/2.7, sufficiently rapid to take photographs in a well-illuminated interior.**

6. **No focussing required,** as all objects are sharp over 5½ feet; for nearer objects inexpensive supplementary lenses can be supplied.

7. **The film spools are very compact and are daylight loading.**

The **KINAMO S 10** has been subjected to very thorough practical tests extending over many months. Manufacture on a large scale has commenced, and it is hoped by the end of January, 1929, sufficient production will be forthcoming to place the camera upon the world's markets.

Price with Zeiss Tessar F/2.7 £20

Special booklets for gratuitous distribution will be ready by the time this announcement appears. Apply to your photographic dealer or to

ZEISS IKON

GARNER & PEELING LTD.

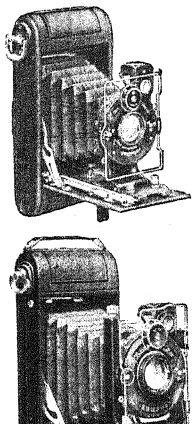
Sole Distributors for ZEISS-IKON,

POLEBROOK HOUSE, GOLDEN SQ., LONDON, W.1

Phone: Regent 6632. **Telegrams: Zeissikona, Phone, London.**

I.F.S. Distributor: **T. H. MASON, 5 Dame Street, DUBLIN.**

ZEISS IKON



THE ICARETTE MODEL 488

TAKING standard roll-films $2\frac{1}{2}'' \times 1\frac{5}{8}''$ this vest pocket camera is a precision model in every sense of the word and everything is consequently of very highest grade. The bellows and covering are of the best quality morocco leather, and both reversible and direct frame finders are supplied. Focussing is performed by means of a lever moving along a curved scale. The perfect quality of the **Zeiss lenses** gives results which can be enlarged to any reasonable size.

	PRICES
With **Zeiss Tessar** F/6.3 in Compur Shutter	£10 7 6
,, ,, ,, F/4.5 ,, ,, ,, ...	11 0 0
,, Novar Anastigmat F/6.8 in Compur Shutter	8 10 0
,, Dominar ,, F/4.5 ,, ,, ,, ...	9 15 0

THE ICARETTES Models 500/1, 501/1

Model 500/1 for $3\frac{1}{4}'' \times 2\frac{1}{4}''$ Pictures. Model 501/1 for $4\frac{1}{4}'' \times 2\frac{1}{2}''$ Pictures

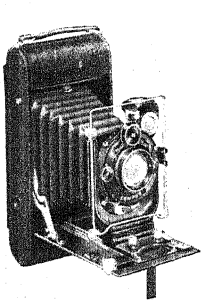
THESE cameras are exquisitely finished precision cameras, in the highest possible class. They are constructed of metal throughout, strong, rigid, compact and light. Best morocco leather covering and bellows, radial focussing, hinged "U" standard front. Both reversible brilliant and wire frame finders are supplied. **Zeiss Tessar** lenses and Compur shutters.

	PRICES $3\frac{1}{4}'' \times 2\frac{1}{4}''$	$4\frac{1}{4}'' \times 2\frac{1}{2}''$
F/6.3 **Zeiss Tessar**	£10 5 0	£11 0 0
F/4.5 **Zeiss Tessar**	11 2 6	11 15 0
F/4.5 Dominar	9 12 6	10 2 6

THE ICARETTE Model 500/2

THIS is a similar model to the 500/1, but has double extension actuated by rack and pinion, and back panel to take slides and focussing screen. For roll fims $3\frac{1}{4}'' \times 2\frac{1}{4}''$ or plates $3\frac{1}{2}'' \times 2\frac{1}{2}''$.

PRICE—Fitted complete with F/4.5 **Zeiss Tessar** in Compur shutter, focussing screen, 3 slides **£13 10 0**



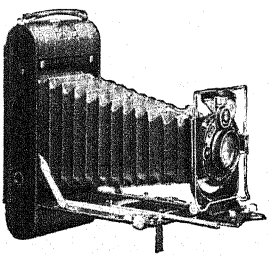
THE

LLOYD ROLL-FILM CAMERAS

Model 510/1 for Roll Films and Plates $4\frac{1}{4}'' \times 3\frac{1}{4}''$

THIS is a quality camera, very similar to the Nixe listed below, with the exception that the bellows are single extension only. Focussing is performed by rack and pinion. The back is adapted to take a focussing screen, and slides for plates, which can be supplied at a slight extra cost.

	PRICES $4\frac{1}{4}'' \times 3\frac{1}{4}''$
With F/4.5 Dominar and Compur shutter	£12 5 0
,, F/6.3 **Zeiss Tessar** in Compur shutter	13 0 0
,, F/4.5 ,, ,, ,, ,, ...	14 0 0



THE NIXE ROLL-FILM CAMERAS

Model 555/1 for Roll Films or Plates $4\frac{1}{4}'' \times 3\frac{1}{4}''$
,, 595/1 ,, ,, ,, $5\frac{1}{2}'' \times 3\frac{1}{4}''$

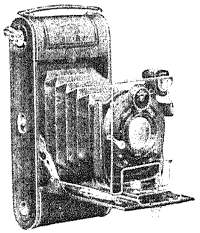
THE Nixe is a precision de Luxe model camera and the very best all-round instrument it is possible to make. It combines in its design the convenience of roll films and all the movements of a plate camera. Double extension leather bellows, rising and cross fronts, wire frame and brilliant finders are provided. The body is all metal covered with best morocco leather. Hinged lens standard and specially designed spool holders permit of easy loading.

	PRICES $4\frac{1}{4}'' \times 3\frac{1}{4}''$	$5\frac{1}{2}'' \times 3\frac{1}{4}''$
With F/6.3 **Zeiss Tessar** In Compur ..	£15 5 0	£16 10 0
,, F/4.5 ,, ,, ,, ..	16 2 6	18 7 6
,, F/6.3* ,, **Double Protar** in Compur	24 5 0	26 12 6

Nixe models are equipped with backs to take slides and focussing screen, which can be supplied at extra cost. Prices on application. *Leather cases. Prices on application.* *F/7.2 in $5\frac{1}{2}'' \times 3\frac{1}{4}''$ size.

Garner & Peeling Ltd., Polebrook House, Golden Square, London. W.1.

ZEISS IKON



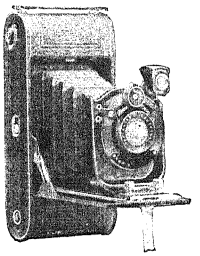
COCARETTE Model 209

For 3¼″×2¼″ Roll film pictures.

THIS is the latest **Zeiss Ikon** camera production. The No. 209 Cocarette is a real gem of a camera and offers value which can only be described as extraordinary, having regard to the very high class nature of the equipment. Made entirely of metal, real leather covering and bellows. Radial focussing engraved in feet. Two finders, direct and reflecting. **F/4.5 Preminar or Dominar Anastigmat,** or the world-renowned **Zeiss Tessar** F/4.5, forms the optical Equipment.

PRICES

With Dominar F/4.5 in Compur Shutter (1 sec. to 1/250th) ..	**£7 5 0**
,, ,, ,, Klio Everset Geared Shutter (1 sec. to 1/100)	**6 12 6**
,, **Zeiss Tessar** F/4.5 in Compur Shutter	**8 12 6**

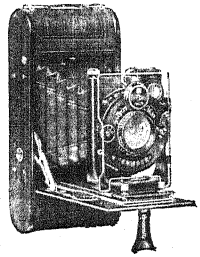


COCARETTE Models 210 & 220

Model 210 for 3¼″×2¼″ Roll films. Model 220 for 4¼″×2½″ Roll Films

THESE Cocarettes have had a wonderful sale and are certainly the most popular folding pocket roll film cameras ever placed upon the market. Their popularity is well deserved, for the value offered is extraordinary. They are thoroughly well made and equipped with high grade lenses. The body is entirely made of light metal, covered fine grain leatherette and relieved by the well-known Cocarette inlaid finish. Bellows, real leather and brilliant type of finders are fitted. There is nothing better at the price.

PRICES	3¼″×2¼″	4¼″×2½″
With F/9 **Frontar** in speed shutter	**£3 0 0**	—
,, F/6.3 **Novar** in 3 speed shutter	**3 10 0**	**4 15 0**



COCARETTE

Models 211, 221, 241, 261

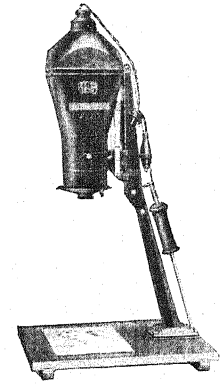
Model 211 for 3¼″×2¼″ Pictures. Model 221 for 4¼″×2½″ Pictures
,, 241 ,, 4¼″×3¼″ ,, ,, 261 ,, 5½″×3½″ ,,

THESE Cocarettes are perfectly designed instruments of the highest class, embodying every modern improvement in this class of instrument, and equipped with **Zeiss Tessar** lenses. The appearance is particularly handsome. Unique inlaid leather covering; the patent film guides which keep the films as flat as a glass plate. Focussing is by radial movement, both reflecting and wire finders are supplied, and the front can be raised or lowered by micrometer movement.

PRICES

F/4.5 **Zeiss Tessar** in Compur shutter	3¼″×2¼″	4¼″×2½″	4¼″×3¼″	5½″×3½″
	£10 0 0	**£11 7 6**	**£13 0 0**	**£15 15 0**

Prices of leather carrying cases on application.



THE MIRAPHOT

THE Miraphot is an automatic focussing vertical enlarger for electric light and can be used from any ordinary house circuit.

The Miraphot is extremely simple, as all that is necessary in order to focus, is to adjust the handle so that the desired size is obtained on the board.

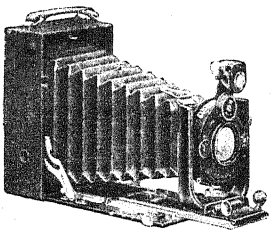
It takes negatives 9×12 cm. or ¼-plate, and makes enlargements up to 15″×12″. Smaller negatives can be used and the approximate degree of enlargement obtained is 3½ times linear.

PRICES

With F/4.5 **Zeiss Tessar** with lamp	**£11 12 6**
,, F/6.8 Novar ,, ...	**8 7 6**

Gas filled lamp (any voltage 110 to 250). Please state voltage when ordering, **3/9**
6 feet of flex with lamp plug adapter, **4/-**

ZEISS IKON



THE MAXIMAR

For Plates and Film Packs

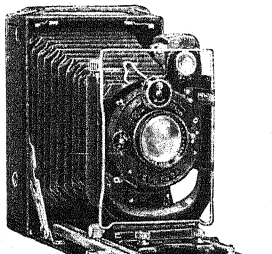
Model 107/1, 3½″×2½″ **Model 207/1, 4¼″×3¼″**

THIS is a beautifully finished high-class double extension camera at a strictly moderate price. The body is drawn from one piece of metal, the lens and shutter are carried on a strong "U" front, double extension leather bellows, rack and pinion focussing, reversible reflecting finder, hooded focussing screen.

PRICES	3½″×2½″	4¼″×3¼″
F/4.5 Dominar in Klio 7 speed shutter	£7 12 6	£8 12 6
F/4.5 Dominar in Compur shutter ..	8 5 0	9 5 0
F/4.5 **Zeiss Tessar** in Compur shutter	9 15 0	11 0 0

Prices include three single slides.

Extra 3½″×2½″ slides 1/9 — 3½″×2½″ Film pack adapter 7/3
„ 4¼″×3¼″ „ 2/- — 4¼″×3¼″ „ „ 8/-



TRONA Models 110 & 212

Model 110 for 3½″×2½″ for Plates and Film Packs
„ 212 „ 4¼″×3¼″ „ „ „

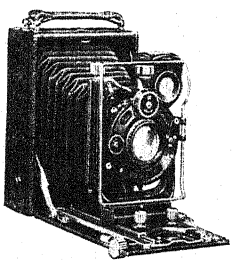
THE Trona is a Zeiss Ikon camera made to minimum dimensions and weight, and is made of metal throughout.

Double extension leather bellows by rack and pinion, rising and cross front, reversible reflecting and direct vision frame finders, hinged "U" front, leather covering and bellows.

Prices include three single slides and hooded focussing screen.

PRICES	3½″×2½″	4¼″×3¼″
F/4.5 Dominar in Compur shutter	£9 5 0	£11 5 0
F/6.3 **Zeiss Tessar** in Compur shutter ..	9 17 6	12 0 0
F/4.5 „ „ „ „ ..	10 12 6	13 0 0

Extra 3½″×2½″ slides 1/9 — 3½″×2½″ Film pack adapter 7/3
„ 4¼″×3¼″ „ 2/- — 4¼″×3¼″ „ „ 8/-



THE IDEAL

For Plates and Film Packs

Model 111, 3½″×2½″ **Model 225, 4¼″×3¼″**

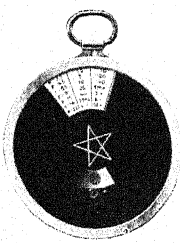
THIS is a perfect precision camera for general all-round work. Double extension bellows, micrometer rising front, cross front fixed by a clamping screw, rack and pinion focussing, both reflecting and Iconometer view finders, best quality leather covering and bellows. Camera body is drawn from one piece of metal.

The Ideal is a perfect example of Zeiss Ikon instrument work.

PRICES. Including Compur shutter and three single slides.

	3½″×2½″	4¼″×3¼″
F/6.3 **Zeiss Tessar**	£12 10 0	—
F/4.5 **Zeiss Tessar**	13 5 0	£17 10 0
F/6.3 **Zeiss Double Protar** ..	21 0 0	24 5 0

Extra 3½″×2½″ slides 3/3 — 3½″×2½″ Film pack adapter 7/3
„ 4¼″×3¼″ „ 3/6 — 4¼″×3¼″ „ „ 8/-



THE DIAPHOT

An Exposure Meter for the Vest Pocket. No sensitive paper required

THE Diaphot solves the question of exposure for the novice and expert in a simple and practical manner, and with the utmost accuracy.

The meter is of the visual type, the correct time for exposure being ascertained by viewing the actual subject through a little blue window and reading the required exposure opposite the lens aperture which you desire to use.

PRICE

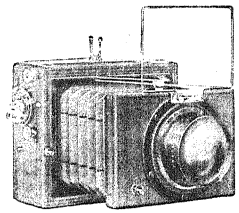
In leather case **£0 4 0**

Garner & Peeling Ltd., Polebrook House, Golden Square, London. W.1.

ZEISS IKON

NETTEL Focal Plane Camera

$2\frac{3}{8}$″×$1\frac{3}{4}$″ $3\frac{1}{4}$″×$2\frac{1}{2}$″ $4\frac{1}{4}$″×$3\frac{1}{4}$″ 10×15 cm. $6\frac{1}{2}$″×$4\frac{3}{4}$″



THE Nettel possesses the following special features :—

1. Focussing is by means of a milled knob which adjusts the length of the struts, lenses of varying foci can be fitted.
2. A patented gear brake is used to obtain the very extensive range of speeds provided, which vary with the different sizes from $\frac{1}{2}$ sec. or $\frac{1}{4}$ sec. to 1/1200th or 1/2800th of a sec.
3. By pressing a button the shutter blind can easily be wound clear for focussing.

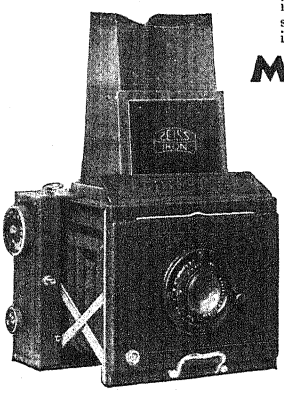
PRICES

Which include slides, for six plates

	$2\frac{3}{8}$″×$1\frac{3}{4}$″	$3\frac{1}{4}$″×$2\frac{1}{2}$″	$4\frac{1}{4}$″×$3\frac{1}{4}$″	10×15 cm.
F/4.5 **Zeiss Tessar**	£29 5 0	£24 7 6	£30 7 5	£37 12 6
F/3.5 „ „	—	29 12 6	37 12 6	42 0 0
F/2.7 „ „	35 12 6	35 12 6	48 0 0	—

Prices of film pack adapters and other accessories on application.

NOTE.—The NETTEL has now been adopted by the ZEISS IKON Company as their standard focal plane camera, experience having proved that for press and topical work this particular design is most perfect. The strength of its construction, the high shutter speeds and the wide latitude in focussing have placed the NETTEL in the first position as regards focal plane cameras.



MIROFLEX FOLDING REFLEX

$4\frac{1}{4}$″×$3\frac{1}{4}$″ or 9×12 cm., for Plates and Film Packs

THE Miroflex is the latest folding reflex brought out by the Zeiss Ikon Company. It is a marvel of mechanical construction, being equally suitable for use as a focal plane camera or folding reflex.

The focal plane shutter is speeded from 1/3rd to 1/2000th of a sec., which speeds are obtained by a special gearing arrangement ; one knob entirely controls the working of the shutter.

The reflex hood when folded down enables the camera to be used exactly like the usual focal plane type.

The Miroflex body is made of light metal, covered with morocco leather. Focussing by means of focussing mount.

PRICES

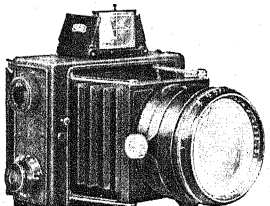
Including six single slides

With F/4.5 **Zeiss Tessar**	£39 12 6
„ F/3.5 „ „	49 12 6
„ F/2.7 „ „	60 7 6

Extra slides 2/- each. Film pack adapter 8/-

ERMANOX with F/1.8 Ernostar

$2\frac{5}{16}$″×$1\frac{3}{4}$″. $3\frac{1}{4}$″×$2\frac{1}{2}$″. For Plates or Film Packs



TO satisfactorily design such a camera as the Ermanox, with its Ernostar Anastigmat having the phenomenal rapidity of F/1.8 was no easy matter. The rapidity of the Ernostar is over six times as fast as F/4.5, and fifteen times F/6.8. Moreover, even at full aperture the Ernostar covers the plate, and the rapidity enables short exposures to be given with ordinary gas or electric light, indoors or out-of-doors.

The camera body is all metal and equipped with a self-capping focal plane shutter giving exposures from 1/10th—1/1000th of a sec. and time. Speeds can be altered both before and after setting.

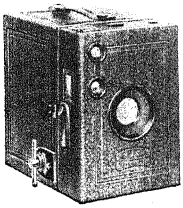
The Ermanox is specially suitable for theatre work, that is, instantaneous photographs by ordinary stage lighting.

PRICES

$2\frac{5}{16}$″×$1\frac{3}{4}$″ **£39 12 6**, including three single slides.
$3\frac{1}{4}$″×$2\frac{1}{2}$″ **£64 0 0**, including three double dark slides.
$2\frac{5}{16}$″×$1\frac{3}{4}$″ Film pack adapter **6/9** $3\frac{1}{4}$″×$2\frac{1}{2}$″ Film pack adapter, **25/6**

Garner & Peeling Ltd., Polebrook House, Golden Square, London. W.1

ZEISS IKON



THE BOX TENGOR for ROLL FILMS

THE Box Tengor is the best box roll fim camera on the market. Its outstanding features are :—

1. Extreme compactness; being smaller, size for size, than other box cameras.

2. Made entirely of light metal, therefore not liable to warp, as is the case with cameras made of wood or fibre.

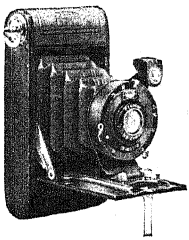
3. The Goerz Frontar Lens gives sharp definition, and working at F/11 has nearly twice the rapidity of lenses fitted to cheaper box cameras.

4. With the 3¼"×2¼" and 4¼"×2½" sizes, supplementary lenses are supplied without extra cost for groups, 10 to 12 feet, which makes the camera an all-focus camera.

5. The covering is of first-quality leatherette.

PRICES .. .. 3¼"×2¼", **£1 1 0** 4¼"×2½", **£1 10 6**

Portrait Lens for 5 to 6 feet distance, 3¼"×2¼", or 4¼"×2½", 4/6 extra.



THE IKONETTE

THIS little camera has been introduced to meet the modern demand for "a no trouble" camera at a very low price. The lens is the Zeiss Ikon FRONTAR. The shutter gives both time and instantaneous exposures and provision is made for three stops :—F/9 (full aperture), F/12 and F/25.

When the front of the camera is set in the ordinary way, everything is focussed from 12 feet to infinity. By a simple press upon a lever the distance of 6 feet, for portraits, can be focussed. By an ingenious device the focussing is always re turned to the infinity point without any attention from the user.

The price of the IKONETTE, covered in fine grain leatherette, real leather bellows and with F/9 Zeiss Ikon Frontar, is **£1 17 6**

Soft leather case .. **4/6**

Zeiss Ikon Film



Spools of 6 exposures Daylight Loading Roll Film, to suit any standard make of camera

Code No.	In.	s.	d.
*A 8	2⅛× 1⅝	1	2
B 11	3¼× 2¼	1	2
D	4¼× 2½	1	5
E	4¼× 3¼	2	0
G	5½× 3¼	2	6

*8 exposures

WE assert with confidence that ZEISS IKON FILMS are on a par as regards quality with Zeiss Ikon Cameras, which is another way of saying that no better sensitive material can be obtained. Every amateur who wishes to make certain of obtaining the best results in his Zeiss Ikon, or for that matter any other camera, must use ZEISS IKON ROLL FILMS and FILM PACKS. In addition to its great rapidity, fine grain and extreme latitude in exposure, the Zeiss Ikon emulsion has a special protective coating, which entirely prevents those annoying scratches called "telegraph wire markings" which are a source of trouble to film users. This protective feature alone should induce every amateur photographer to at least demand from his dealer a Zeiss Ikon Film as a trial. The emulsion is orthochromatic and the celluloid base free from scratches or blemishes.

Film Packs, 12 exposures each, Daylight Loading

In.	4Cm.	s.	d.
2½× 1¾	4½× 6	1	8
3¼× 2¼	6 × 9	2	4
4¼× 3¼	8 ×10½	4	0
5½× 3¼	8 ×14	5	0
—	9 ×12	4	8
—	10 ×15	6	4

Price of other sizes on application.

Garner & Peeling Ltd., Polebrook House, Golden Square, London. W.1

Mimosa

THE MIMOSA COMPANY of DRESDEN are the most important and most successful manufacturers of the highest quality photographic papers in Germany. They produce all kinds of printing papers, both for printing by daylight, as e.g., **Self toning and printing out papers**; also development papers such as **bromide** and **gaslight papers** and **rotary cardboard** for automatic photo printing machines.

The best-known MIMOSA brands are:

VEROTYPE

A rapid **gaslight paper**, having a semi-matt surface giving brown-black tones, for portraits, etc.

CARBON BROWN

Also a **gaslight paper**, yielding by development only and with absolute certainty, a range of tones from black-brown to orange.

ORTHOTYPE

The **most rapid gaslight paper** made, giving brilliant black tones, or carbon brown effects when toned with the Mimosa Carbon Toner.

SUNOTYPE

A **slow developing gaslight paper** for blue-black tones. Allows 200 per cent. latitude in exposure—a favourite with photo finishers.

BROMIDE SPECIAL

A **fast Bromide** of special quality, equally satisfactory for contact work as for enlarging.

GRAVURE (non-coated paper)

A **gaslight paper** practically non-coated, which gives wonderful shadow details and an engraving effect.

AUROTYPE

A self-toning, **daylight printing paper**, yielding all gradations of tone up to violet-black. Supplied in many grades and in a variety of tinted bases.

All the above are supplied in many different grades, and also on postcards.

COMPLETE LIST FREE ON APPLICATION TO THE

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Mimosa A.-G. Dresden 21

Mimosa

MIMOSA FILMS

The **Mimosa Film** embodies all the scientific knowledge and practical experience gained in the field of film manufacture. Its excellent gradation of tone, in conjunction with very high colour sensitiveness, freedom from halation and a highly sensitive emulsion of finest grain, render it an ideal material for the amateur. Supplied in **ROLL FILMS** of all the usual sizes, **FILM PACKS, CINE NEGATIVE and POSITIVE STOCK,** and **PORTRAIT FILMS.**

EXCLUSIVE MIMOSA SPECIALITY DIAPOSITIVE FILM

This film is supplied in all sizes. **Coated on opalescent celluloid.** The **Mimosa Diapositive Film** is principally used for propaganda purposes, especially by cine theatres. The effect when illuminated from behind is very fine and gets over the difficulty with ordinary bromide prints, which are practically useless for advertising purposes at night. The **Mimosa Diapositive Film** is just as effective when viewed by reflected light. Commercial photographers should try this new medium, which will open up new and profitable business for them.

MIMOSA PLATES

In all grades and sizes, for all photographic purposes. **Extra Rapid, Ultra Portrait, Portrait Ortho, Orthochromatic, Ortho Antihalo, Lantern and Process.**

All paper, films and plates sent overseas are coated with a special tropical emulsion.

Sole Distributors in Great Britain and Ireland

GARNER & PEELING LTD.,

POLEBROOK HOUSE, GOLDEN SQUARE, LONDON, W.1

Enquiries from the Dominions and elsewhere should be addressed to

Mimosa A.-G. Dresden 21



R. F. HUNTER, Ltd.

INTRODUCE

Nagel

CAMERAS.

OLD ASSOCIATIONS WITH NEW IDEAS.

In the BRITISH JOURNAL ALMANAC, 1924 issue, was stated how, in his kitchen, **Dr. Nagel** constructed his first camera. Since then, owing to his many triumphs, he has become one of the most dominating figures in the Camera World. From the "kitchen" camera, developed the world-known factory of **Contessa-Nettel,** with **Dr. Nagel** officiating as Managing Director.

Then, with the Zeiss-Ikon amalgamation, into which **Contessa-Nettel** were merged, he was appointed one of the leading directors. After 18 months only in this capacity, however, he decided to re-commence manufacturing on his own account, and the result is a modern factory, situated in Stuttgart, equipped with the very latest up-to-date machinery for camera production. R. F. Hunter, Ltd., who previously acted as sole representatives for Contessa-Nettel, in Gt. Britain, have been invited by Dr. Nagel to again join forces, and now camera enthusiasts have the opportunity of possessing a camera constructed according to modern principles, with every up-to-date movement, and designed by a **master mind.**

Particulars of various models given in the following pages.

OTHER MODELS IN COURSE OF CONSTRUCTION.

LOOK FOR THE NAME "NAGEL" ON THE CAMERA.

R. F. HUNTER, LTD.,

Wholesale Photographic Supplies,

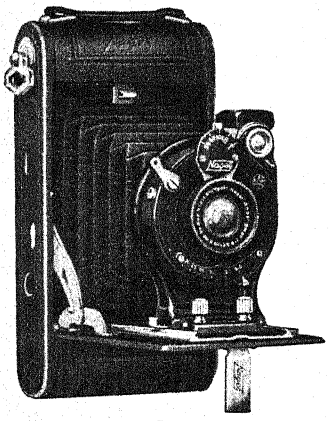
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COMPREHENSIVE CATALOGUE. Postage 3d.

Nagel CAMERAS



THE Nagel No. 65.

THE Nagel No. 65

For ROLL-FILMS

3¼×2¼

Single Extension.

One of the outstanding features of this model is the smallness of construction. Although it is nearly one inch shorter than other 3¼×2¼ roll film cameras, it still takes standard size films and gives exactly same size picture.

THE SMALLEST 3¼ × 2¼ ROLL-FILM CAMERA EVER MADE

SPECIFICATION:

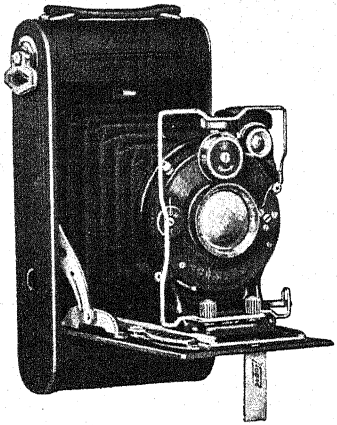
Body.—All Metal.
Covering.—Real Leather.
Bellows.—Real Leather.
Runners.—Solid Profile Brass.
Focussing.—By Scale (Automatic Device).
Lens Front.—Cast of Light Metal, Very Rigid.
View Finder.—Brilliant Folding, Reversible in own lens mount.
Tripod Bushes.—Two, for Upright and Oblong Pictures.
Shutter.—3-Speed, 1/25th, 1/50th, 1/100th, Time and Bulb.
Lens.—Nagel Anastigmat F/6.8.

Size: 6×3⅛×1¾ ins.
Weight: Approx. 16 ozs.

Price £3 7s. 6d.

R. F. HUNTER, Ltd., 40, DOUGHTY ST., LONDON, W.C. 1.
SOLE IMPORTERS.

Nagel CAMERAS



THE Nagel No. 74.

THE Nagel No. 74.

For ROLL FILMS

3¼ × 2¼.

Single Extension.

Exactly the same in construction and size as the "**Nagel 65**" (illustrated on opposite page), but with additional features and F/4.5 lens.

SPECIFICATION :

Body.—All Metal.
Covering.—Real Leather.
Bellows.—Real Leather.
Runners.—Solid Profile Brass.
FOCUSSING.—Radial Lever.
Lens Front.—Cast of light metal. Very Rigid.
Size.—6 × 3⅛ × 1¼ ins.
Weight.—Approx. 18 ozs.

View-Finders.—Brilliant Finder with Spirit Level attached, also Wire Frame Finder with Invisible Back-sight.

Tripod Bushes.—Two for Upright and Oblong Pictures.

Shutter.—Ibsor (7 Speed, Time and Bulb) or Compur.

PRICES :

WITH NAGEL ANASTIGMAT F/4.5 in	Ibsor 7-speed shutter ...	£6	12 6
" " " "	Compur ...	£7	2 6
" DALLMEYER " "	Ibsor 7-speed shutter ...	£7	10 0
" " " "	Compur ...	£8	0 0

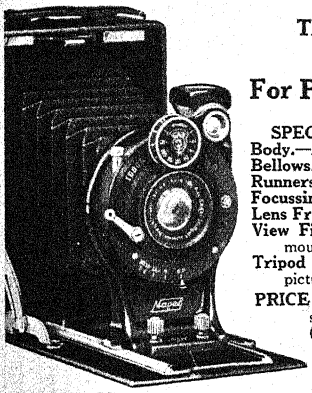
BOTH THE NAGEL 65 & 74 MODELS ARE ADMITTED BY EXPERTS TO BE

A MASTERPIECE OF CONSTRUCTION

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SOLE IMPORTERS

Nagel CAMERAS



THE Nagel No. 10

$3\frac{1}{2} \times 2\frac{1}{2}$

For PLATES & FILM PACKS

Single Extension.

SPECIFICATION :

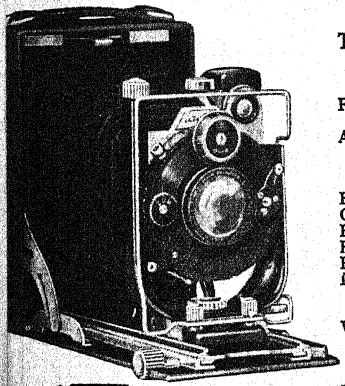
Body.—All Metal. **Covering.**—Real Leather.
Bellows.—Real Leather.
Runners.—Solid Profile Brass.
Focussing.—By scale (automatic device).
Lens Front.—Cast of light metal.
View Finder.—Brilliant, reversible in own lens mount.
Tripod Bushes.—Two, for upright and oblong pictures. **Size.**—$4\frac{3}{4} \times 3\frac{1}{4} \times 1\frac{5}{8}$ ins.

PRICE (Fitted with **Nagel** F/6.8 lens in 3-speeded shutter, Time and Bulb): **£3 12s. 6d.**
(Complete with 2 metal Slides and Release).

E Nagel *No. 10.*

THE Nagel No. 14

Similar in every respect to Model No. 10, but with
DIAL LEVER FOCUSSING, WIRE FRAME FINDER AND NAGEL F/4.5
IS IN 7-SPEEDED, TIME AND BULB SHUTTER ... **£6 0s. 0d.**



THE Nagel No. 18

$3\frac{1}{2} \times 2\frac{1}{2}$

FOR PLATES & FILM PACKS. DOUBLE EXTENSION. A DE LUXE MODEL IN EVERY SENSE OF THE WORD

SPECIFICATION :

Body.—All Metal.
Covering.—Real Leather.
Bellows.—Real Leather.
Runners.—Solid Profile Brass.
Focussing.—Rack and Pinion.
Lens Front.—U-shaped front, rising and cross movement, adjustable by Micrometer Screw.
View-Finders.—Large brilliant automatic folding with spirit level, reversible in own lens mount, also Wire Frame Finder with Backsight.
Tripod Bushes.—Two for upright and oblong pictures.

IE Nagel *No. 18.*

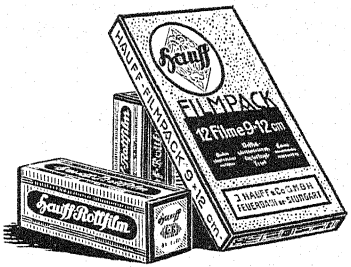
Size, $4\frac{3}{4} \times 3\frac{1}{4} \times 1\frac{5}{8}$ ins. Weight, approx., 23 ozs.

ICE (WITH NAGEL ANASTIGMAT CONVERTIBLE LENS F/4.5 IN COMPUR SHUTTER. **£9 12s. 6d.** (Complete with 3 Metal Slides and release.)
Extra Slides, 1s. 8d. each. Film Pack Adapter, 7s. 3d. (Leather covered.)

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ROLL FILMS AND FILM PACKS

Coated with the World Famous Hauff Plate Emulsion.

Made in all popular sizes.

HAUFF ROLL FILMS AND FILM PACKS COMBINE SPEED WITH ORTHOCHROMATISM, AND ARE SUITABLE FOR ALL THE YEAR PHOTOGRAPHY.

WONDERFUL LATITUDE, NON-CURLING AND EXTREMELY FINE GRAIN.

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It is unwise to buy unknown chemicals. Avoid all risks. **Insist on HAUFF. Look for the name on the label.**

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METOL - ORTOL GLYCIN - ADUROL

DEVELOPER SOLUTIONS.

METOL-ADUROL. NEOL. CARBONAL.

FLASH POWDER.

Keeps indefinitely. Very rapidly ignited and gives minimum amount of smoke. Packed in tins—4 sizes.

10 Grms. 25 Grms. 50 Grms. 100 Grms.

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SOLE IMPORTERS for all HAUFF PRODUCTS.

Hauff PLATES

Hauff PLATES are manufactured according to modern principles and under the scientific control of expert workmen. The claims which are made for **HAUFF PLATES** necessitates the use of the **Very Best Quality Materials** procurable.

KNOWN EVERYWHERE AS THE DEPENDABLE PLATE.

Included in the range of **HAUFF PLATES** are two new productions, viz. :—

ULCROMA and ANALO-FLAVIN. Particulars appended.



Hauff ANALO-FLAVIN

(H. & D. 240.)

In introducing the **ANALO-FLAVIN** the firm of **HAUFF** have scored yet another wonderful triumph. This plate is prepared with a brown INTERMEDIATE LAYER which absolutely PREVENTS HALATION.

The emulsion is **high-speed orthochromatic** (240_0 H.& D.17_0 Scheiner) ; is **very sensitive to green and has modified sensitiveness to blue.** In addition it allows great latitude in exposure and **permits of very short exposures.**

The adaptability of the **HAUFF ANALO-FLAVIN** is very wide, and it may justly be termed the **ideal universal plate.** For all outdoor exposures, particularly snow scenes and mountain landscapes ; for sport pictures, for indoor or counter-light exposures, in the professional's studio, especially when photographing coloured costumes, under all conditions, in fact, the **HAUFF ANALO-FLAVIN PLATE** will give the most valuable service. Its **high colour sensitiveness,** especially to yellow and green, permits **instantaneous exposures even with strong filters** without risk of under-exposure. A descriptive pamphlet dealing with the **ANALO-FLAVIN** will be sent, post free on request.

Hauff ULCROMA

(H. & D. 650-700).

GENUINELY MARKED.

An **ULTRA-RAPID COLOUR-SENSITIVE PLATE.** Specially suitable for Half-Watt and Artificial Studio Portraiture, Press Work and High-speed Outdoor Photography. Wonderful Latitude Fine Grain and Highly Orthochromatic.



OTHER HAUFF PLATES.

ULTRA-RAPID (H. & D. 500-575). Specially recommended for **Studio and Press** work.

EXTRA-RAPID (H. & D. 240). The popular plate for **Snapshots** and all outdoor photography. Ideal for architecture.

EXTRA-RAPID ORTHO (H. & D. 240). The **Landscape Plate.** When using a filter the orthochromatic effect is considerably increased.

FLAVIN (H. & D. 240). Excellent for **Tone Values.** Recommended for Landscape photography. Highly sensitive to Yellow and Green with strongly reduced Blue sensitiveness.

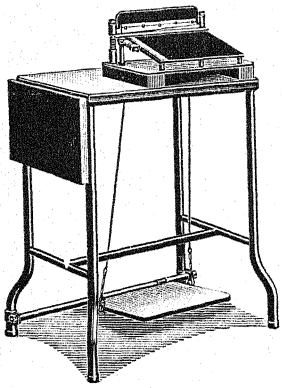
ORTHO-ANTIHALO (H. & D. 120). The ideal plate for **Copying,** reproduction of paintings, etc.

LANTERN (H. & D. 8-10). One of the most popular lantern plates obtainable. Very easily manipulated.

For Prices and Full Particulars of all HAUFF PRODUCTS write to Sole Distributors.

D. & P. APPARATUS

TRIMMING MACHINE WITH TREADLE. No. 235.



A KINDERMANN PRODUCT.

Specially constructed for **Trimming White Margins** in variable widths. Trimming is carried out by light foot pressure on the pedal, leaving both hands free for manipulation. The trimmer is exceptionally quick in use and large quantities of prints can be trimmed in a very short space of time.

DESCRIPTION.

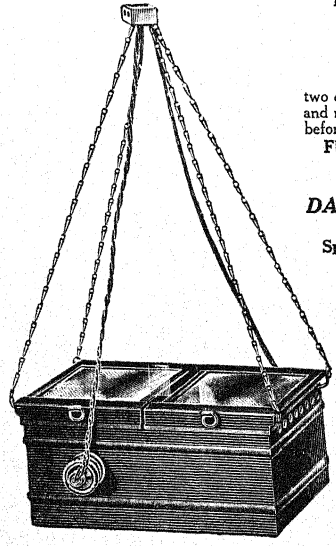
The Trimmer itself is solidly constructed of **all-metal,** with no loose parts to get out of order, the Table of well-seasoned hard wood and the legs of steel. The knife which descends on to the print is governed by two strong rods, and is automatically returned to its original position by Spiral Springs. For trimming **White Margins** the prints are simply placed under a steel rule, the width of the margin being governed by a micrometer screw. A perfectly square cut is ensured, and an important feature is that the machine can be used as an ordinary Straight Cut Trimmer.

Length of Cut: 10 ins.
Dimensions: Height, 28 ins.;
Length, 21½ ins.;
Width, 13 ins.

PRICE (complete with table) **£5 15s. 0d. net.** (Carriage extra).

In addition to the machine as illustrated, two deep trays are included which fit at left and right of Trimmer, for prints to be placed before and after trimming.

FULL PARTICULARS FREE ON REQUEST.



DARK ROOM LAMP. No. 40.

A KINDERMANN PRODUCT.

Specially Recommended for D. & P. Specialists.

For **Electric Light.** Constructed to give indirect reflected lighting. For hanging from ceiling of dark-room. Size, 10½×8 ins., 4¾ ins. deep. Fitted with two pieces of interchangeable ruby glass. Arranged to take two ordinary standard Bayonet Fitting electric globes, 60 c.p., which give a safe and even light. It is advantageous to cover the ceiling above lamp with a sheet of light-covered pasteboard, for by this method the whole dark-room is illuminated, enabling several persons to work at the same time.

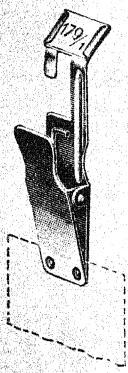
PRICE. Complete with flexible connection and plug, but without electric bulbs. ... ... **20/- net.**

R. F. HUNTER, Ltd., 40, DOUGHTY ST., LONDON, W.C. 1.

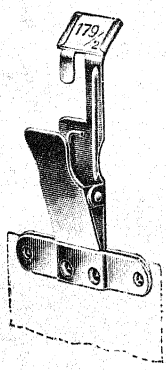
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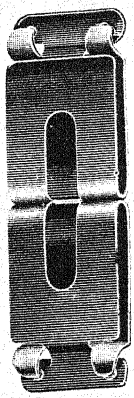
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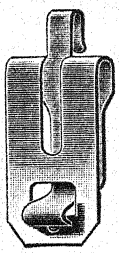
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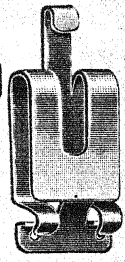
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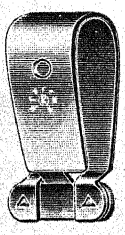
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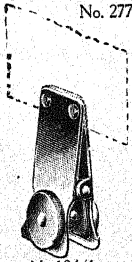
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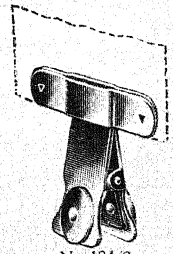
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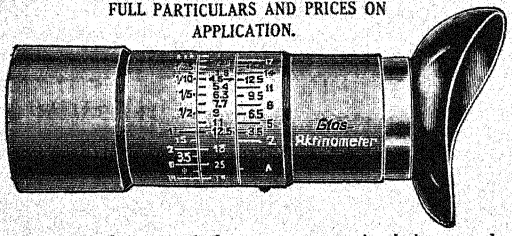


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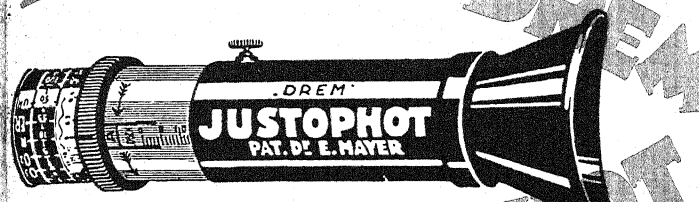
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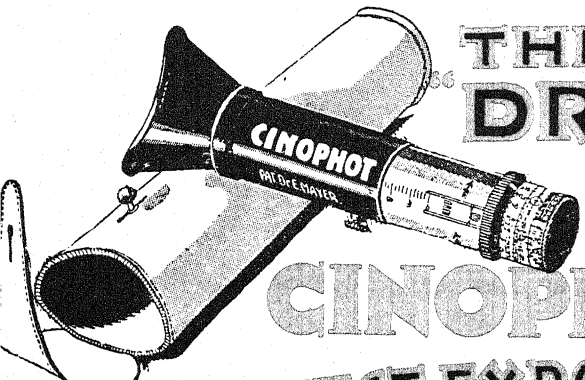
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ONE LOOK SHOWS THE CORRECT STOP TO USE WITH THE CINE KODAK.

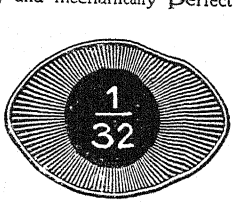
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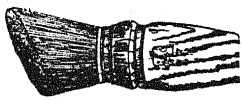
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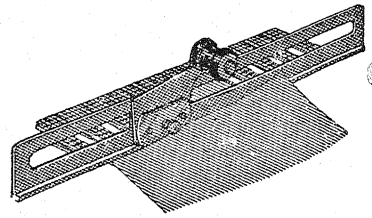
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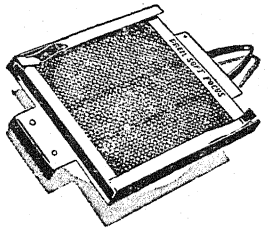


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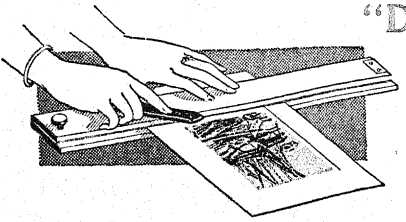
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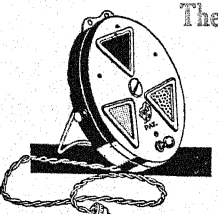
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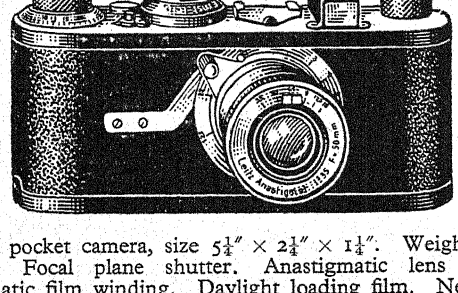
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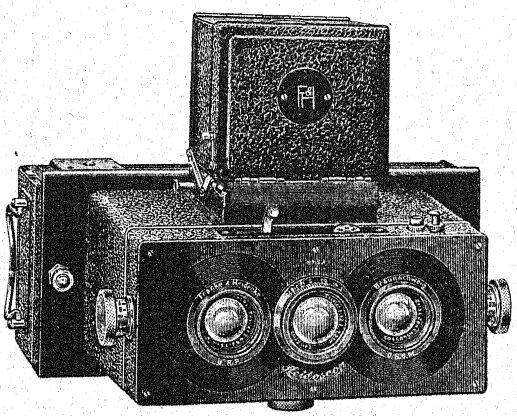
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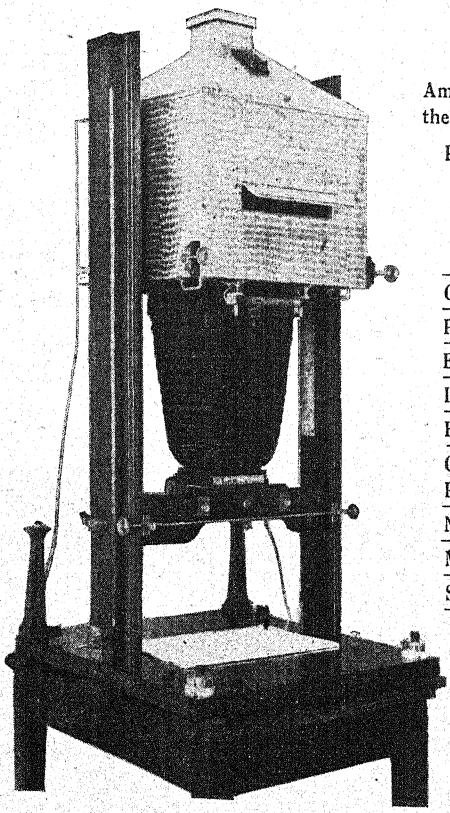
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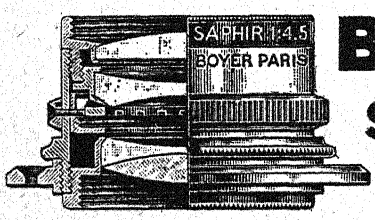
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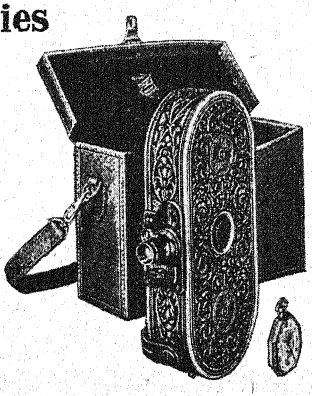
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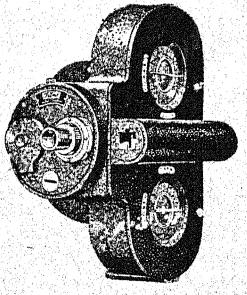
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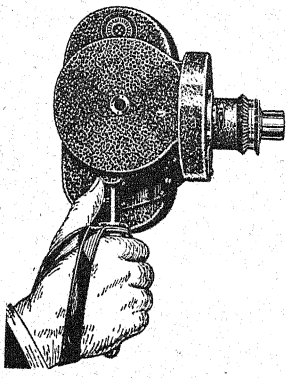
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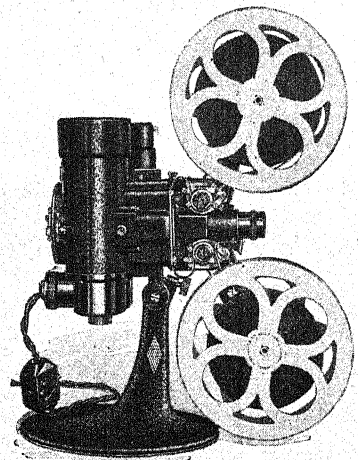
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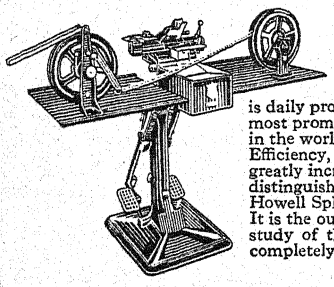
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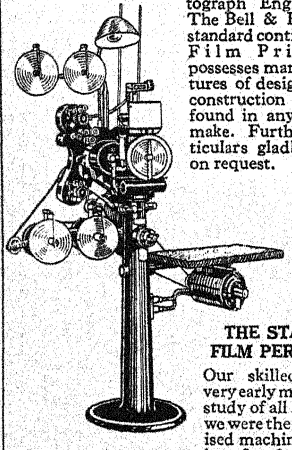


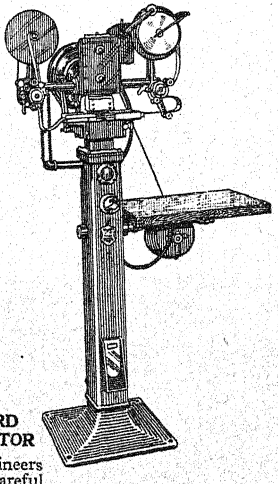
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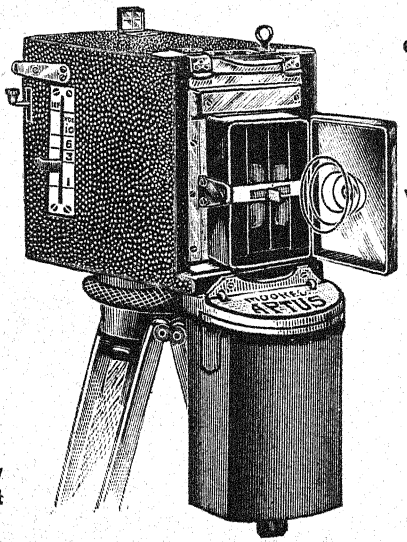
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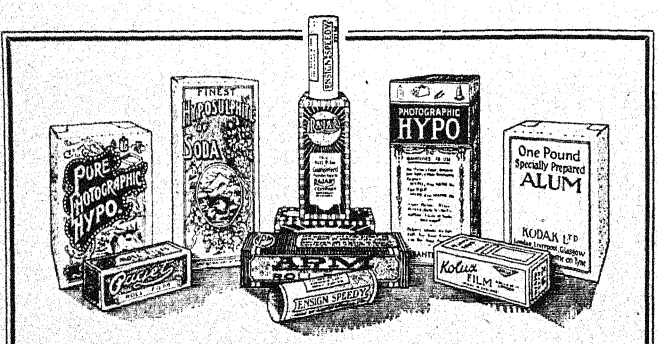
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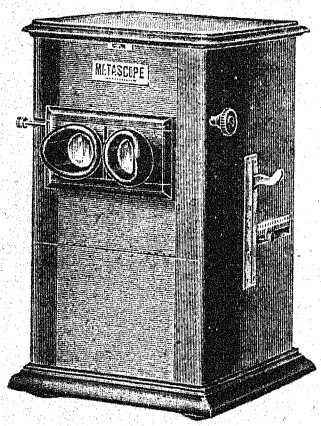
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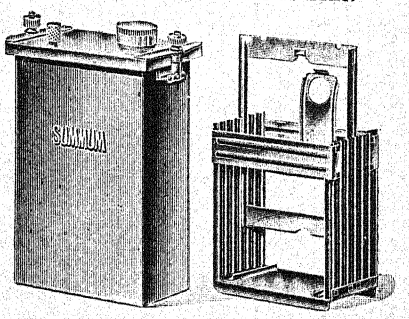
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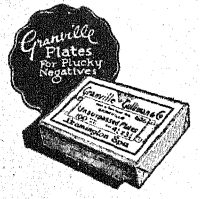
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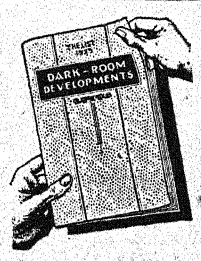


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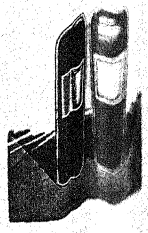
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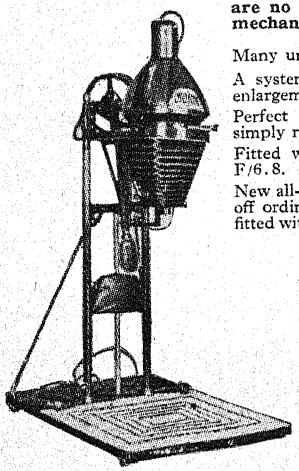
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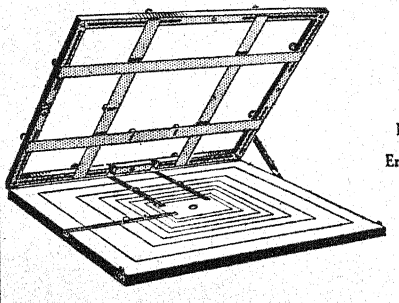
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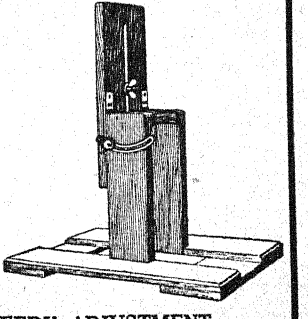
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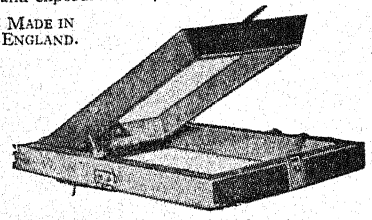
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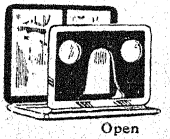
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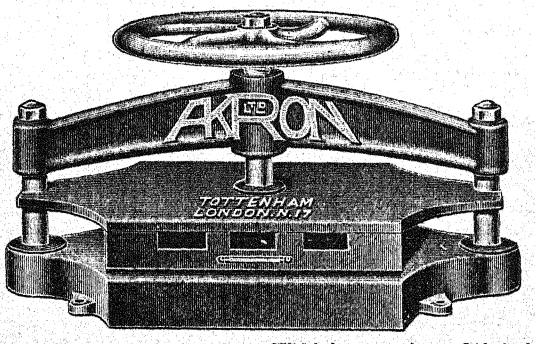
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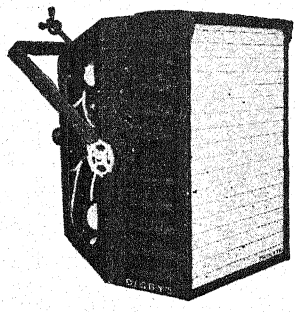
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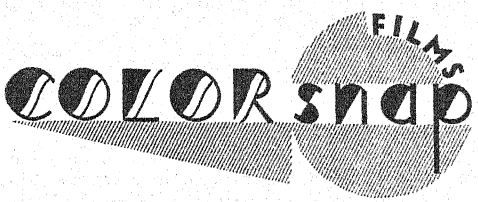
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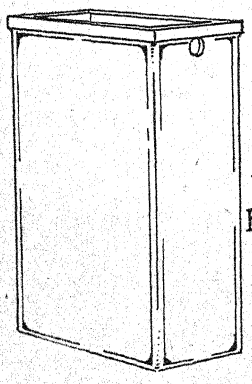
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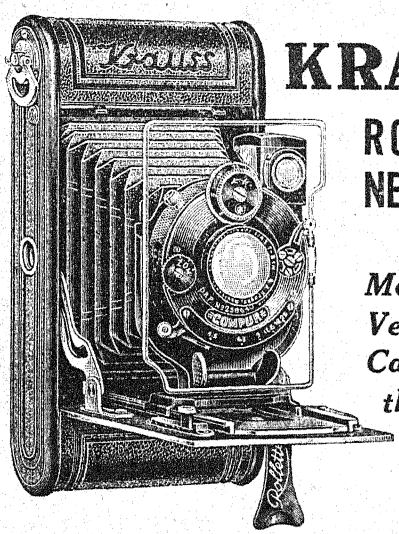
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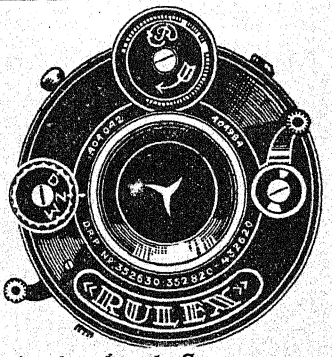
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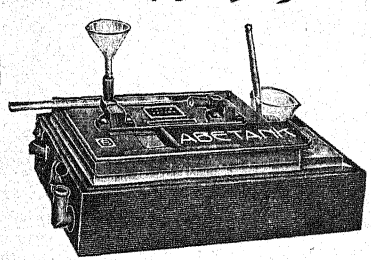
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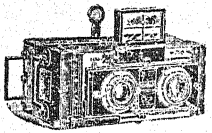
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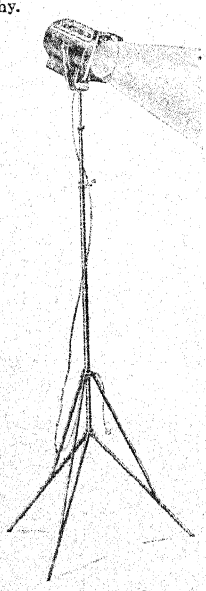
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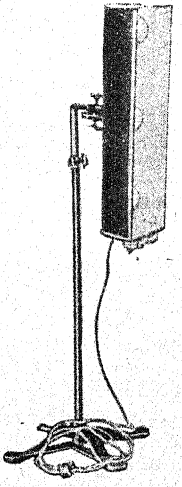
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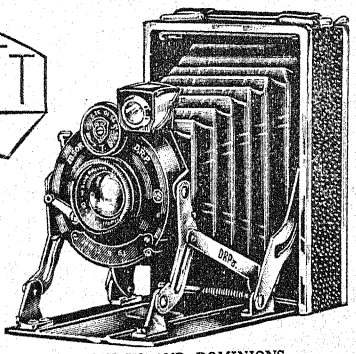
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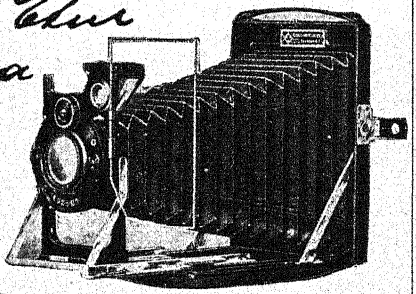
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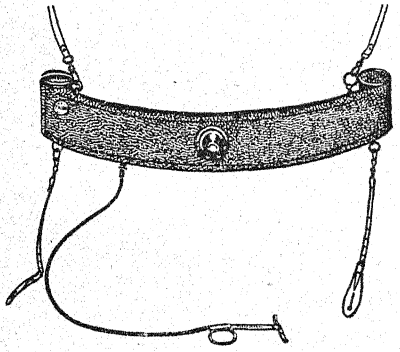




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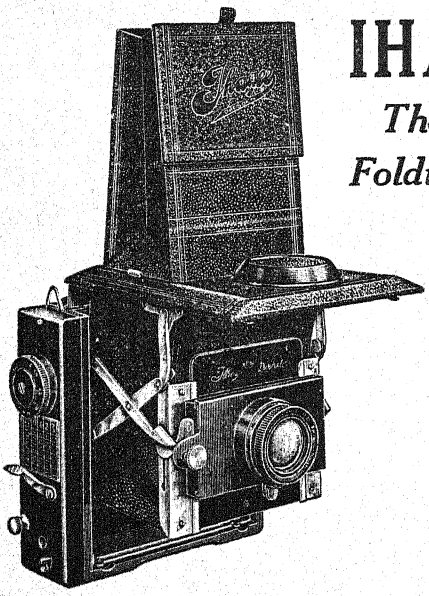
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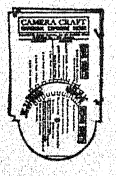


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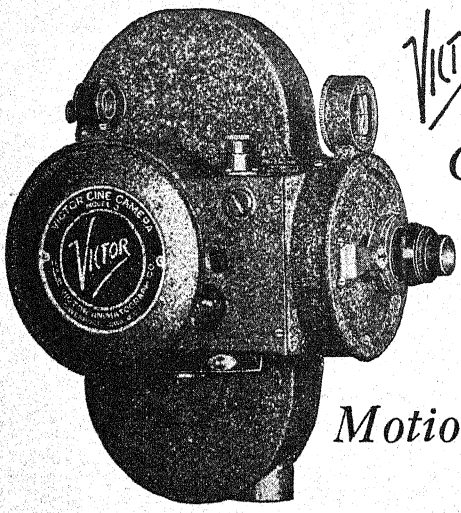


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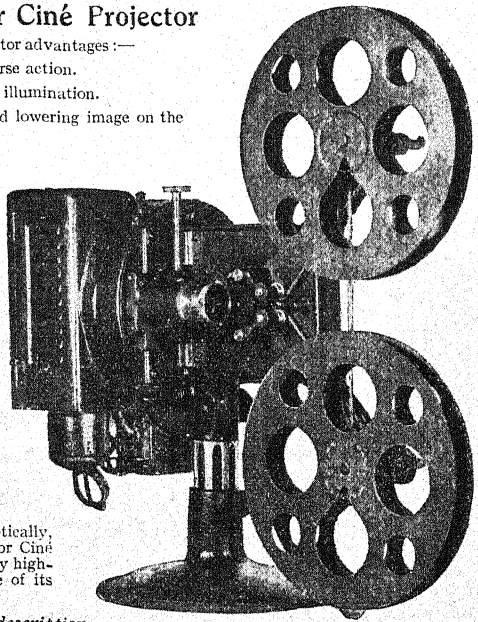
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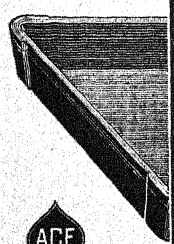
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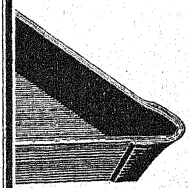
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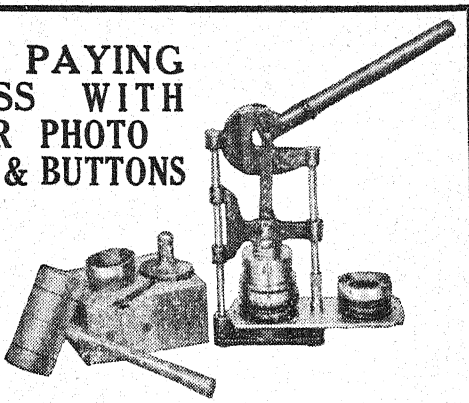


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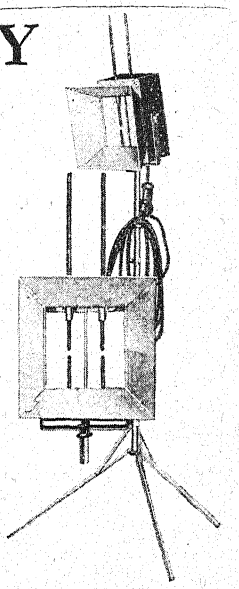
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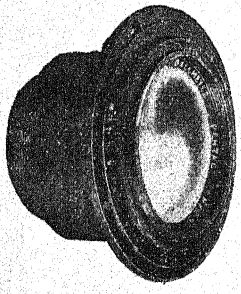
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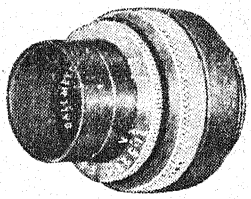
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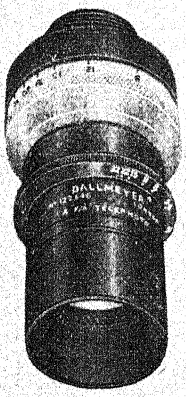
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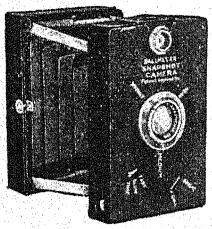
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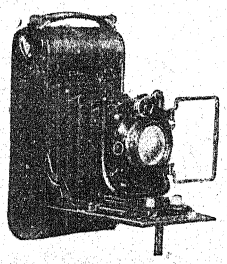
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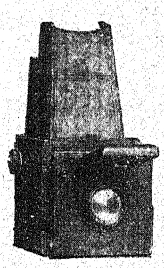


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Adams, A., & Co., Ltd., 24, Charing Cross Road, London, W.C. 2. 'Phone, Gerrard 4931. Telegrams—Pyro, Westrand, London. Factory, Dalston, N.

Adams, S. R., & Co., Battersea Square, London, S.W. 11. 'Phone, Battersea 0699. Telegrams—Leacamace, Batt, London.

Adherent Tissue Co., Ltd., 117A, Fore Street, Upper Edmonton, London, N.18. 'Phone, Tottenham 1660. Telegrams—Adhertisco, Tottlane, London; also 17, Maddox Street, Regent Street, W. 1. 'Phone, Mayfair 2416.

Adhesive Dry Mounting Co., Ltd., 27-28, Fetter Lane, London, E.C. 4. 'Phone, Central 5107. Telegrams—Accroitre, Fleet, London.

Aerofilms, Ltd., Colindale Avenue, The Hyde, Hendon, London, N.W. 9. 'Phone, Colindale 6581 (two lines). Telegrams—Aerofilms, Hendon, London.

Aerograph Co., Ltd., 43, Holborn Viaduct, London, E.C. 1. 'Phone, Holborn 2041 and 2795. Telegrams—Aerography, London.

Aerostyle, Ltd., 174-176, St. John Street, Clerkenwell, London, E.C. 1. 'Phone, Clerkenwell 7963. Telegrams—Aerostyle, Smith, London.

Agfa, Ltd., 91, New Oxford Street, London, W.C. 1. 'Phone, Museum 4038-9. Telegrams—Agfafoto, Westcent, London.

Akron, Limited, 569, High Road, Tottenham, London, N. 17. 'Phone, Tottenham 2404. Telegrams—Akronique, Totteross, London.

Aldis Bros., Sarehole Road, Sparkhill, Birmingham. 'Phone, Acocks Green 325. Telegrams—Optical, Birmingham.

Allan, David, Whitfield Works, Mansfield Street, Kingsland Road, London, E. 2. 'Phone, Bishopsgate 1317.

Allan Manufacturing Co., 129, Gray's Inn Road, London, W.C. 1. 'Phone, Holborn 1763. Telegrams—London, Holborn 1763.

Allison, Morris & Co., 155, Victoria Street, London, S.W. 1. 'Phone, Victoria 2685. Telegrams—Enilinatol, Sowest, London.

Altrincham Rubber Co., 2-4, Kingsway, Altrincham. 'Phone, Altrincham 184. Telegrams—Rubber, Altrincham.

Amalgamated Photographic Manufacturers, Ltd., 3, Soho Square, London, W. 1. 'Phone, Regent 1230 (3 lines). Telegrams—Noiram, Westcent, London.

Amateur Photographer and Cinematographer, Dorset House, Tudor Street, London, E.C. 4. 'Phone, City 2847. Telegrams—Cyclist, Fleet, London.

American Hard Rubber Co. (Britain), Ltd. 13A, Fore Street, London, E.C. 2. 'Phone, Central 2751. Telegrams—Eboniseth, Ave, London.

Angel, H. Reeve & Co., Ltd., 9, Bridewell Place, London, E.C. 4. 'Phone, City 7413. Telegrams—Papermen, Lud., London.

Apem, Ltd., St. Albans Road, Watford, Herts. 'Phone, Watford 73. Telegrams—Apem, Watford.

Archer & Sons. *See* Stokes, G. & N. and Archer.

Army & Navy Co-operative Society, Ltd., Photographic Department, Francis Street, Westminster, London, S.W. 1. Phone, Victoria 8500, Extension 357. Telegrams—Army, Sowest, London.

Artesque Agency, 14-18, Emerald Street, London, W.C. 1. 'Phone, Museum 7521-7522.

Art Trade Journal, 13, Buckingham Street, Strand, London, W.C. 2. 'Phone, Regent 3473.

Ashford, J., & Son, Ltd., 3A, King Alfreds Place, Birmingham.

Associated Photographic Printers, Ltd., 332, Balham High Road, London, S.W. 17. 'Phone, Battersea 6026. Telegrams—Autobrom, Bal, London.

Austin Edwards, Ltd., Coventry Road, Warwick. 'Phone, Warwick 108. Telegrams—Films, Warwick.

Automatic Coil Winder & Electrical Equipment Co., Ltd., Winder House, Rochester Row, London, S.W. 1. 'Phone, Victoria 4350. Telegrams—Autowinda, Sowest, London.

Automatograph, Ltd., Africa House, Kingsway, London, W.C. 2. 'Phone, Holborn 4444.

Autotype Co., Ltd., 59, New Oxford Street, London, W.C. 1. 'Phone, Museum 9331-2. Telegrams—Autotype, London; Autotype Works, Brownlow Road, West Ealing, W. 13. 'Phones, Ealing 2691 and 2692. Telegrams—Autotype, West Ealing.

Avery, W. & T., Ltd., Soho Foundry, Birmingham. 'Phone, Smethwick 300. Telegrams—Avery, Birmingham.

Baird, Andrew H., 33-39, Lothian Street, Edinburgh. 'Phone, Edinburgh 20916. Telegrams—Radium, Edinburgh.

Baker, Charles, 244, High Holborn, London, W.C. 1. 'Phone, Holborn 1427. Telegrams—Optivorum, Westcent, London.

Ball, H. T., 51, Berwick Street, Oxford Street, London, W. 1. 'Phone, Gerrard 6736.

Ballantine, Robert, 103½, St. Vincent Street, Glasgow. 'Phone, Central 5619. Telegrams—Optics, Glasgow.

Bamforth & Co., Ltd., Station Road, Holmfirth, Yorks. 'Phone 107. Telegrams—Bamforth, Holmfirth.

Barlow, J., 10-12, Lambeth Palace Road, London, S.E. 1. 'Phone, Hop 5312-3. Telegrams—Barlassoff, Lamb, London.

Barr & Stroud, Ltd., Caxton Street, Anniesland, Glasgow, W. 3 'Phone, Western (Glasgow) 3775, 3776. Telegrams—Telemeter, Glasgow. London Office: 75, Victoria Street, Westminster, S.W 1. 'Phone, Victoria 6668. Telegrams—Retemelet, Vic., London.

Barratt's Photo Press, Ltd., 89, Fleet Street, London, E.C. 4. 'Phone, City 0902. Telegrams—City 0902, London.

Bartholomew, W. J., & Co. *See* Robinson, King & Co.

Barton, Harvey & Son, Ltd., St. Michael's, Bristol. 'Phone, 1123. Telegrams—Harvey Barton, Bristol.

Bartons' (B'ham), Ltd., 140, Finch Road, Handsworth, Birmingham. 'Phone, Northern 636. Telegrams—Mountable, Birmingham. Also 122, Wigmore Street, Portman Square, London, W. 1. 'Phone, Mayfair 1550. Telegrams—Omounta, Wesdo, London.

Bates Studio, East Street, Chertsey. 'Phone, Chertsey 32. Telegrams—Bates & Son, Chertsey.

Bauchet, M., & Cie, 15, Red Lion Street, London, W.C. 1. 'Phone, Chancery 8541. Telegrams—Zedabepeay, Holb, London.

Bausch and Lomb Optical Co., Ltd., 67-68, Hatton Garden, London, E.C. 1. 'Phone Holborn 2640.

Beagles, J., & Co., Ltd., 9-11, Little Britain, London, E.C. 1. 'Phone, City 4154. Telegrams—Jabee, London.

Bean & Halliday. *See* Halliday & Co.

Beard, R. R., Ltd., 10, Trafalgar Road, Old Kent Road, London, S.E. 15. 'Phone, Rodney 3136. Telegrams—Biojector, Kent, London.

Beck, R. & J. Ltd., 69, Mortimer Street, London, W. 1. 'Phone, Museum 3608. 68, Cornhill, London, E.C. 3. 'Phone, Avenue 5772. Telegrams—Objective, Wesdo, London; and Lister Works, Dickenson Street, Kentish Town, London, N.W. 5.

Beech, Ralph, 27, Goswell Road, London, E.C. 1.

Bell & Howell Co., Ltd., 320, Regent Street, London, W. 1. 'Phone, Langham 4376. Telegrams—Belanhowe, Wesdo, London.

Bemrose & Sons, Ltd., Midland Place, Derby. 'Phone, 471. Telegrams—Bemrose, Derby; 133, High Holborn, W.C. 1. 'Phone, Holborn 8871. Telegrams—Bemrose, Westcent, London.

Bennet-Alder, B., 41, North End Road, London, N.W. 11. 'Phone, Speedwell 1094.

Bennett & Jennison, Ltd., Frame and Moulding Works, Grimsby. 'Phone 2255. Telegrams—Novelties, Grimsby. London showrooms: Napier House, 24/27, High Holborn, W C. 1. 'Phone, Chancery 7717.

Beresford, F., 4, Albert Bridge Road, Battersea, London, S.W. 11.

Bethell, Thos. P., Crown Works, Boundary Place, Liverpool. 'Phone, Royal 1238. Telegrams—Unique Boxes, Liverpool.

Billcliff's Camera Works, Richmond Street, Boundary Lane, Manchester, S.W.

Bird, Graystone, 38, Milsom Street, Bath. 'Phone, 3319. Telegrams—Bird, Photographer, Bath.

Birmingham Moulding Warehouse. *See* Epstein, J., & Co.

Blundell, J., & Sons, 199, Wardour Street, Oxford Street, London, W. 1. 'Phone, Gerrard 4746. Telegrams—Golsilplat, 'Phone, London.

Boake Roberts, A., & Co., Ltd., Carpenters Road, Stratford, London, E. 15. 'Phone, Maryland 1050 (4 lines). Telegrams—Boake, Phone, London.

Boots Pure Drug Co., Ltd. (Photographic Department), Stamford Street, London, S.E. 1. 'Phone, Hop 5800. Telegrams—Regesan, London.

Boulton & Paul, Ltd., Norwich. 'Phone, 851. Telegrams—Boulton, Norwich 135-137, Queen Victoria Street, London, E.C. 4. 'Phone, Central 4642. Telegrams—Boutique, Cent. London.

Brinkman, E., 26-27, Hatton Garden, London, E.C. 1. 'Phone, Holborn 5283.

British Drug Houses, Ltd., 16-30, Graham Street, City Road, London, N. 1. 'Phone Clerkenwell 3000.

British Ever Ready Co., Ltd. *See* Ever Ready Co. (Great Britain), Ltd.

British Gelatine Works, Ltd. *See* **Simeons, C., & Co., Ltd.**

British Journal of Photography, 24, Wellington Street, Strand, London, W.C. 2. 'Phone, Temple Bar 5330. Telegrams—Photometer, Rand, London.

British Monomarks, Ltd., Monomark House, 97, High Holborn, London, W.C. 1. 'Phone, Holborn 3663. Telegrams—Monomark, London.

British Periodicals, Ltd., 19, Cursitor Street, London, E.C. 4. 'Phone, Holborn 6201.

British Photo Button Co. *See* Universal Button Co.

British Photographic Industries, Ltd., 88/89, High Holborn, London, W.C. 1. 'Phone, Holborn 6900.

British Thomson-Houston Co., Ltd., Mazda House, Newman Street, W. 1. 'Phone, Museum 9801. Telegrams—Mazdalux, Westcent, London.

British Xylonite Co., Ltd., Hale End, London, E. 4. 'Phone, Walthamstow 0045. Telegrams—Xylonite, London.

Brown, F. E., & Co., Ltd., Blaby, Nr. Leicester.

Bruce's, Ltd., 28A, Broadway, Ealing, London, W. 5. 'Phone, Ealing 1033.

Bull, J. F., 4, Lower Kennington Lane, London, S.E.11. 'Phone, Reliance 2338.

Burr, Charles, 138, Wakefield Street, East Ham, London, E. 6.

Burroughs Wellcome & Co., Snow Hill Buildings, London, E.C. 1. 'Phone, City 6000. Telegrams—Tabloid, Cent London.

Busch (Emil), Optical Co., Ltd., 37-38, Hatton Garden, London, E.C. 1. 'Phone Holborn 2206. Telegrams—Buschoptik, Smith, London.

Campbell, Colin, 19, Forrest Road, Edinburgh.

Campro Cameras & Films, Ltd., 42, Langham Street, Portland Place, London, W. 1. 'Phone, Museum 6558-6559. Telegrams—Paprefilm, Wesdo, London.

Canadian Kodak Company, Limited, Toronto. Telegrams—Kodak, Toronto.

Carter, Reginald E., 122, Wigmore Street, London, W. 1. 'Phone, Mayfair 1550. Telegrams—Omounta, Wesdo, London.

Cassio Photographic Paper Co., Ltd., Cassio Bridge, Watford, Herts. 'Phone, Watford 482. Telegrams—Cassio, Watford.

Chance Brothers & Co., Ltd., Glass Works, Smethwick, near Birmingham. 'Phone, Oldbury 106. Telegrams—Chance, Smethwick. Scottish Works, Firhill, Glasgow. 'Phone, Maryhill 98. Telegrams—Brogan, Glasgow.

Chapman, J. T., Ltd., Albert Sq., Manchester. 'Phone, Central 960. Telegrams—Camera, Manchester.

Chipper, William C., 39, Highgate Hill, London, N. 19. 'Phone, Mountview 2354.

Christie & Hodgson, Ltd., 246, West Street, Sheffield. 'Phone, 23889.

Church Army Lantern and Cinematograph Dept., 14, Edgware Road, London, W. 2. 'Phone, Paddington 9212. Telegrams—Landept., Padd., London.

Cinema Traders, Ltd., 26, Church Street, Charing Cross Road, London, W. 1. 'Phone, Gerrard 5287 and 5288. Telegrams—Biocinema, Westcent, London.

City Sale and Exchange, Ltd., 81, Aldersgate Street, London, E.C. 1. 'Phone, Clerkenwell 0591. Telegrams—Retoucher, Barb, London ; 90 to 94, Fleet Street, London, E.C. 4. 'Phone, City 6981. Telegrams—Films, Fleet, London ; 54, Lime Street, London, E.C. 3. 'Phone, Monument 0180. Telegrams—Phototypic, Led, London ; The Arcade, Broad Street, London, E.C. 2. 'Phone, Bishopsgate 6799 ; 52, Cheapside, London, E.C. 2. 'Phone, Central 6707.

Collingridge & Co., 281-3, Goswell Road, London, E.C. 1. 'Phone, Clerkenwell 4418.

Colour Photographs (British & Foreign), Ltd., 1, Wilton Place, London, S.W. 1. 'Phone, Sloane 8943.

Colour Snapshots (1928), Ltd., 60, Conduit Street, London, W. 1. 'Phone, Gerrard 1158.

Colour Sprays, Ltd., 228, Pentonville Road, London, N. 1. 'Phone, North 5011.

Connell, A., & Co., Melba House, Wenlock Road, City Road, London, N. 1. 'Phone, Clerkenwell 7266. Telegrams—Nitrozone, Nordo, London.

Cook, W. T., Acme Photo Works, Chaldon Road, Upper Caterham, Surrey. 'Phone, Caterham, 167. Telegrams—Rotaries, Caterham, Surrey.

Cooper, Dennison & Walkden, Ltd., 7, St. Bride Street, London, E.C. 4. 'Phone, Central 4980. Telegrams—Dentags, Fleet, London.

Coronet Camera Co., 48, Great Hampton Street, Birmingham. 'Phone, Northern 1917. Telegrams—Coronetcy, Birmingham.

Cotswold Publishing Co., Ltd., Britannia Mills, Wotton-under-Edge, Glos. Telegrams—Cotswold, Wotton-under-Edge.

Criterion, Ltd., Criterion Works, Stechford, Warwickshire. 'Phone, Stechford 7. Telegrams—Criterion, Stechford ; 71, Fleet Street, London, E.C. 4. 'Phone, City 7407.

Crown Manufactory, 28, Percy Street, Rotherham, Yorks. Telegrams—Crown Works, Rotherham.

Croxley Manufacturing Co. 161-162, Charterhouse Chambers, Charterhouse Square, London, E.C. 1. 'Phone, Clerkenwell 6135. Telegrams—Zealotry, Barb, London.

Cutler Hill Colours and Chemicals, Ltd., Failsworth, Manchester. 'Phone, Failsworth 14. Telegrams — Chemcolor, Failsworth.

Daily Mirror (Photo Sales Department), Geraldine House, Rolls Buildings, Fetter Lane, London, E.C. 4. 'Phone, Holborn 4321 Telegrams, Mirror, Fleet, London.

Dallmeyer, J. H., Ltd., 31, Mortimer Street, Oxford Street, London, W. 1. 'Phone, Museum 6022-3 ; Church End Works, Willesden, London, N.W. 10. 'Phone, Willesden 0176. Telegrams—Dallmeyer Willroad, London.

Davidson, F., & Co., 143 to 149, Great Portland Street, London, W. 1. 'Phone, Langham 2429. Telegrams—Rewrite, Wesdo, London.

Dennison Manufacturing Co., Ltd., Kingsway, London, W.C. 2. 'Phone, Holborn 2376. Telegrams—Tagservis, Westcent, London.

Digby Illuminating Engineering Co., Ltd., 12, Gerrard Street, London, W. 1. 'Phone, Gerrard 936/7. Telegrams—Ohmgeld, Westrand, London.

Dixon, L. S.. & Co., Ltd., 38, Cable Street, Liverpool. 'Phone, Bank 3970. Telegrams—Paper, Liverpool ; 62, Carter Lane, London, E.C. 4. 'Phone, City 1970. Telegrams—Paperical, Cent, London.

Dixon, T. H., & Co., Ltd., Works Road, Letchworth, Herts. 'Phone, Letchworth 165. Telegrams—Theko, Letchworth.

Doughtys, Ltd., 47-48, Savile Street, Hull. 'Phone, Central 6141. Telegrams—Recreative, Hull ; also 10, Whitefriargate Hull, 3, St. Nicholas Street, Scarborough and 8, Manor Street, Bridlington.

Drem Products, Ltd., 37, Bedford Street, Strand, London, W.C. 2 'Phone, Regent 0840. Telegrams—Dremphoto, Westrand, London.

Droege & Co., 43-45, Comeragh Road, West Kensington, London, W. 14. 'Phone, Riverside 1382.

Duke & Neddermeyer. *See* Loveless and Hunter.

Edison Swan Electric Co., Ltd., 123-125, Queen Victoria Street, London, E.C. 4. 'Phone, City 9881. Telegrams—Ediswan, London.

Electric Fires, Ltd., Norwich. 'Phone, Norwich 1537. Telegrams—Heatrae, Norwich.

Elliott & Sons, Ltd., Barnet, Herts. 'Phone, Barnet 0011. Telegrams—Elliott, Barnet.

Elliott, J., Parade Works, Nottingham. Telegrams—Elliott, Parade, Nottingham.

Epstein, J., & Co., 7-11, Milk Street, Bristol. 'Phone, 3793. Telegrams—Mouldings, Bristol ; also, 105, Mansion House Chambers, Queen Victoria Street, London, E.C. 4. 'Phone, City 6111.

E.S.S. Colour Filter Co., 1, Montague Street, London, W.C. 1. 'Phone, Museum 2161.

Eveling & Tress, Ltd., 4A, Rathbone Place, Oxford Street, London, W. 1. 'Phone, Museum 6361.

Ever Ready Co. (Great Britain), Ltd., Hercules Place, Holloway, London, N. 7. 'Phone, North 5401 (8 lines). Telegrams—Eveready, Holway, London.

Fallowfield, Jonathan, Ltd., 61-62, Newman Street, Oxford Street, London, W. 1. 'Phone, Museum 8318. Telegrams—Fallowfield, Wesdo, London.

Farrow, E. H. 84, Hazelville Road, Hornsey Rise, London, N. 19.

Flatters & Garnett, Ltd., 309, Oxford Road, Manchester. 'Phone, Ardwick 3533. Telegrams—Slides, Manchester.

Forbest, Ltd., Taymouth Works, Broughty Ferry, Dundee. 'Phone, 7176 B.F. Telegrams—Forbest, Ltd., Broughty Ferry.

Fordham & Co., Ltd., Victoria Works, Victoria Road, Walthamstow, London, E. 17. 'Phone, Walthamstow 0244. Telegrams—Permanent, Phone, London.

Forrest, T. W., 46, Addington Road, London, E. 3. 'Phone, East 4262.

Fourdrinier, Hunt & Co., 8, Chingford Mount Road, London, E. 4. 'Phone, Chingford 510.

Foyle, W. & G., Ltd., 119-125, Charing Cross Road, London, W.C. 2. 'Phone, Gerrard 9310. Telegrams—Foylibra, Westcent, London.

Franklin, W. H., 437, High Road, Leyton, London, E. 10.

Froggatt, H. J., Cromwell House, Fulwood Place, High Holborn, London, W.C. 1. 'Phone, Chancery 7054 (two lines). Telegrams—Froggatt Jamarker Holb, London.

Frost & Reed, Ltd., 10, Clare Street, Bristol. 'Phone, 2765. Telegrams—Frost & Reed, Bristol ; 26c, King Street, St. James', London, S.W. 1. 'Phone, Gerrard 6581.

Fry, E. B., Ltd., 110, Pratt Street, Great College Street, Loudon, N.W. 1. 'Phone, North 2448. Telegrams—Frylant, Norwest, London.

Fry, S. H., 5, Highbury Grove, London, N. 5. 'Phone, North 1668. Telegrams—Fry, North, 1668

Fuerst, Bros., & Co., Ltd., 17, Philpot Lane, London, E.C. 3. 'Phone, Royal 6911. Telegrams—Fuerst, London.

Furse, W. A., 27, Chancery Lane, London, W.C. 2. 'Phone, Holborn 6895.

Gamage, A. W., Ltd., Holborn London, E.C. 1. 'Phone, Holborn 8484. Telegrams—Gamage, Holborn, London.

Gandolfi, Louis, 84, Hall Road, Peckham Rye, London, S.E. 15.

Garner & Peeling, Ltd., Polebrook House, Golden Square, London, W. 1. 'Phone, Regent 6632. Telegrams—Zeisikona, Phone London.

Garratt & Atkinson, Warwick Works, Ealing, London, W. 5. 'Phone, Ealing 1760. Telegrams—Atkingarr, Phone, London.

Gask, Arthur, Ltd., 60, Conduit Street, Regent Street, London, W. 1. 'Phone, Gerrard 3988. Telegrams—Gaskibbo, Piccy, London.

Gear, John H., 8, Nottingham Terrace, Marylebone Road, London, N.W. 1. 'Phone, Welbeck 2204.

Gem Dry Plate Co., Ltd., 14, Ashford Road, Cricklewood, London, N.W. 2. 'Phone, Willesden 0164. Telegrams—Chemitype, Crickle, London.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C. 2. 'Phone, Regent 7050. Telegrams—Electricity, Westcent, London

Gevaert, Ltd., 115, Walmer Road, North Kensington, London, W. 10. 'Phone, Park 4333 (2 lines). Telegrams—Artoveg, Nottarch, London.

Gibson, C. M., 15, Charles Street, Hatton Garden, London, E.C. 1. 'Phone, Holborn 0800.

Glanvill, H. G., 256, Balsall Heath Road, Birmingham.

Glasgow Camera Exchange, 99, Waterloo Street, Glasgow, C.2. 'Phone, Central 5447.

Glazine Pad Co., 163 & 165, Gibraltar Street, Sheffield.

Glossoid Co., Ltd., 8, Mason's Avenue, London, E.C. 2. 'Phone, Wall 6130.

Graber, Ellis, 16, Newton Road, Tunbridge Wells. Telegrams—Graber, Tunbridge Wells.

Grant, Thos. K., Ltd., Polebrook House, Golden Square, London, W. 1. 'Phone, Regent 5600. Telegrams—Diamido, Piccy, London.

Greater Felcourt Co., East Grinstead, Sussex. 'Phone, 45, Lingfield. Telegrams—Matthews, 45 Lingfield.

Green, A. W., 70, High Holborn, London, W.C. 1. 'Phone, Chancery 7004.

Greenwood, Henry, & Co., Ltd., 24, Wellington Street, Strand, London, W.C. 2 'Phone, Temple Bar 5330. Telegrams—Photometer, Rand, London.

Griffin, John J., & Sons, Ltd., Kemble Street, Kingsway, London, W.C. 2. 'Phone, Gerrard 2621. Telegrams—Gramme, Westcent, London.

Griffiths Bros. & Co., London, Ltd., Macks Road, Bermondsey, London, S.E. 16. 'Phone, Bermondsey 1151-1153. Telegrams—Aquol, Southpark, London.

Griffiths, R., 26-31, Eyre Street Hill, Holborn, London, E.C. 1. 'Phone, Clerkenwell 5867. Telegrams—Eyragrif, Holb., London.

Guiterman, S., & Co., Ltd., 35 and 36 Aldermanbury, London, E.C. 2. 'Phone, Wall 8074. Telegrams—Guiterman, Phone, London.

Guiliman, Granville & Co., 29, Warwick Place, Leamington Spa. Telegrams—"Granville, Leamington." 'Phone, 847. 57-58, Chancery Lane, W.C 2. 'Phone and Telegrams—Chancery 8537, and 174, Corporation Street, Birmingham 'Phone and Telegrams—Central 2482.

Hall, B. J., & Co., Ltd., Chalfont House, Great Peter Street, London, S.W. 1. 'Phone, Victoria 6693. Telegrams—Inspect, Sowest, London.

Halliday & Co., Holbeck New Mills, Holbeck Lane, Leeds. 'Phone, Leeds 22251. Telegrams—Halmac, Leeds.

Hamel, E., & Co., Premier Studios, Palmerston Street, Woodborough Road, Nottingham. 'Phone, 41547. Telegrams—Hamel, Nottingham.

Harbutt's Plasticine, Ltd., Bathampton, Bath. 'Phone, 8209. Telegrams—Plasticine, Bath; London Office and Showroom, 56, Ludgate Hill, E.C 4. 'Phone, City 7362.

Hardtmuth, L. & C., 29, Kingsway, London, W.C. 2. 'Phone, Gerrard 7499.

Harrap, John, & Son, 3, Holborn Buildings, Holborn Bars, London, E.C. 1. 'Phone Holborn 2020. Telegrams—Harsonart, Smith, London.

Harrington Bros., Ltd., 4, Oliver's Yard, City Road, London, E.C. 1. 'Phone, Clerkenwell 1007 Telegrams Siccative, Finsquare, London.

Harringtons, Ltd., 386, George Street, Sydney, N.S.W.; also Katoomba, Melbourne, Brisbane, Adelaide and Hobart, Australia; also Wellington and Auckland, New Zealand. Cables—Harrington, Sydney.

Harrods, Limited, Knightsbridge, London, S.W. 1. 'Phone, Sloane 1234. Telegrams—Harrods, Everything, London.

Haseler, Charles, & Son, Ltd., 94, Bridge Street West, Birmingham. 'Phone Telegrams—Northern, 1690, Birmingham.

Hathern Station Brick & Terra Cotta Co., Ltd., Loughborough, Leicestershire. 'Phone, 611. Telegrams—Bricks, Hathern Station.

Heaton, Wallace, Ltd., 119, New Bond Street, London, W. 1. 'Phone, Mayfair 2066-2067; also, 47, Berkeley Street, W. 1. 'Phone, Grosvenor 2691. Telegrams—Zodellaria, Wesdo, London. Works and Studios, 28-30, Avery Row and 52, Brooks Mews, W. 1

Hesketh, R., 65, Westgate, Hale, Altrincham. 'Phone, Altrincham 1062. Telegrams—Hesketh, Altrincham 1062.

Hewittic Electric Company, Ltd., Walton-on-Thames, Surrey. 'Phone, Walton-on-Thames 762, 763. Telegrams—Hewittic, Walton-on-Thames.

Higgins, C. M., & Co., 16, Farringdon Avenue, London, E.C. 4. 'Phone, Central 0801. Telegrams—Plicated, Fleet, London.

Hilger, Adam, Ltd., 24, Rochester Place, Camden Road, London, N.W. 1. 'Phone, North 1677. Telegrams—Sphericity, 'Phone, London.

Hinton & Co., 152, High Holborn, London, W.C. 1. 'Phone, Holborn 0988. Telegrams—Sensitize, London.

Hockett, S. W., Photographic Works. Potters Road, New Barnet, Herts. 'Phone, Barnet 0158.

Hocking, S., Oswaldwistle, Accrington,

Holmes Brothers (London), Ltd., Howard Works, Billet Road, Walthamstow, London, E. 17. 'Phone, Walthamstow 1340 (2 lines). Telegrams—Dogfish, Phone, London.

Hood & Co., Ltd., Sanbride Press, and 97, Albert Road, Middlesbrough, 'Phone, 518. Telegrams—Sanbride, Middlesbrough.

Hora, Tudor T., 346, York Road, Wandsworth, London, S.W. 18. 'Phone, Battersea 0327. Telegrams—Hora, Chemist, Wandsworth, London.

Horne's Camera Mart, 58, Old Broad Street, E.C. 2, and 32, Gracechurch Street, London, E.C. 3. 'Phone, Wall 6336. Telegrams—London Wall 6336.

Houghton-Butcher (Great Britain), Ltd., Ensign House, 88/89, High Holborn, London, W.C. 1. 'Phone, Holborn 6900. Telegrams—Bromide, Phone, London : Works, Walthamstow, E. 17. Branches : Glasgow, Leeds, Manchester, Nottingham, Swansea, and at Bombay and Calcutta.

Houghton-Butcher Manufacturing Co., Ltd., Fulbourne Road, Walthamstow, London, E. 17. 'Phone, Walthamstow 0080. Telegrams—Rhamnus, Phone, London.

Howard & Jones, Ltd., 26-28, Bury Street, St. Mary Axe, London, E.C. 3. 'Phone, Avenue 4389 (3 lines). Telegrams—Overissue, London.

Howell, Charles, 137, Promenade, Blackpool.

Hughes, W. C., & Co., Brewster House, Mortimer Road, Kingsland, London, N. 1. 'Phone, Clissold 1122. Telegrams—Pamphengos, Kinland, London.

Hunt, Philip G., & Co. *See* Associated Photographic Printers.

Hunter, R. F., Ltd., 40, Doughty Street, London, W.C. 1. 'Phone, Holborn 7311-2. Telegrams—Buxhunter, Holb., London.

Hunter-Penrose, Ltd., 109, Farringdon Road, London, E.C. 1. 'Phone, Clerkenwell 6626. Telegrams—Huntomatic, Smith, London. 51, International Exchange, Church Street, Birmingham. 'Phone, Central 7427 ; 21, Cannon Street, Manchester. City 2169 ; 349, Cathedral Street, Glasgow. 'Phone, Bell 1405.

Ilford, Limited, Ilford, London. 'Phone, Ilford 0013 (3 lines). Telegrams—Plates, Ilford.

Illingworth, Thos., & Co., Ltd., Cumberland Avenue, Park Royal, Willesden Junction, London, N.W. 10. 'Phone, Willesden 2384. Telegrams—Squeegee, 'Phone, London.

Imperial Dry Plate Co., Ltd., Cricklewood, London, N.W. 2. 'Phone, Willesden 4286 (2 lines). Telegrams—Impeople, Crickle, London.

Ince Brothers, 66, Hatton Garden, London, E.C. 1. 'Phone, Holborn 0245.

Indian & Colonial Supply Association, 83-86, Farringdon Street, London, E.C. 4. 'Phone, City 6363. Telegrams—London City, 6363.

Infallible Exposure Meter Co., Wrexham. 'Phone, Wrexham, 1 × 2. Telegrams —Infallible Exposure, Coedpoeth.

International Film Traders, 5, Denmark Street, Charing Cross Road, London, W.C. 2. 'Phone, Gerrard 7951. Telegrams—Robfeature, London.

Janoviteh, M., 19, Broad Street, Golden Square, London, W. 1. 'Phone, Regent 4702. Telegrams—Uniplates, Piccy, London.

Jefferies & Co., Ltd., 7, Pembroke Gardens, High Road, Seven Kings, Essex. Also 24, Great Russell Street, London, W.C. 1. 'Phone, Museum 0085. Telegrams—Jefprint, London.

Jeffery & Boarder, 55 and 56, Mattock Lane, West Ealing, London, W. 13. 'Phone, Ealing 0875.

Jepson, Warren & Co., Regent Works, off Hyde Park Road, Leeds. 'Phone, 26294. Telegrams—Jepson, Regent Works, Leeds.

Johnson & Sons, Manufacturing Chemists, Ltd., Hendon, London, N.W. 4. 'Phone, Hendon 2070-1-2 (3 lines). Telegrams —Caustic, London. Also 12, Queen Street, Deansgate, Manchester.

Johnson & Sons, Smelting Works, Ltd., 27-33, Paul Street, Finsbury, London, E.C. 2. 'Phone, Clerkenwell 2417 (2 lines). Telegrams—Cauterism, Finsquare, London.

Johnson, Fredk., & Co., Ltd., 140, Southwark Street, London, S.E. 1. 'Phone, Hop 4404-5 Telegrams—Usapacol, Boroh, London.

Johnson Matthey & Co., Ltd., 73/82, Hatton Garden, London, E.C. 1. 'Phone, Holborn 6989. Telegrams—Matthey, Smith, London.

Johnson, Wm., & Sons (London), Limited, 18, Union Street, Southwark, London, S.E. 1. 'Phone, Hop 4950.

Jones, Samuel, & Co., Ltd., Bridewell Place, London, E.C. 4. 'Phone, City 9407. Telegrams—Noncurling, Lud, London.

Jones, W. H., & Co., 36, Cannel Street, Ancoats, Manchester. 'Phone, City 2734.

Kamm & Co., Ltd., 27, Powell Street, Goswell Road, London, E.C. 1. 'Phone, Clerkenwell 6595. Telegrams—Zerograph, Barb, London.

Kentmere, Ltd., Staveley, Westmorland. 'Phone, Staveley 5. Telegrams—Kentmeres, Staveley, Westmorland.

Kerotype, Limited, 2, The Pavement, Clapham, London, S.W. 4. 'Phone, Battersea 4085.

King, J. C., Ltd., 42 to 60, Goswell Road, London, E.C. 1. 'Phone, Clerkenwell 2317 and 2319. Telegrams—Mainboom, London.

King, W., & Co., 9, Southsea Road, Kingston-on-Thames.

Kodak, Limited, Kingsway, London, W.C. 2. 'Phone, Gerrard 0970. Telegrams—Kodak, London. Works, Wealdstone, Middlesex. 'Phone, Harrow 80. Telegrams—Kodak, Wealdstone, 70. Lord Street, Liverpool. 'Phone, Royal 2597. Telegrams—Kodak, Liverpool; 46, Buchanan Street, Glasgow. 'Phone, Central 8011. Telegrams—Kodak, Glasgow; 34, Grainger Street, Newcastle-on-Tyne. 'Phone, 1674. Telegrams—Kodak, Newcastle-on-Tyne; 45, Corporation Street, Birmingham. 'Phone, Central 1940. Telegrams—Kodak, Birmingham; 89, Grafton Street, Dublin. 'Phone 1798. Telegrams—Kodak, Dublin.

Kodak, Limited, Kodak House, Hornby Road, Bombay. Telegrams—Kodak, Bombay.

Kodak, Limited, 8, Battery Road, Singapore. Telegrams—Kodak, Singapore.

Kodak, Limited, Noordwijk 38, Weltevreden, Batavia, Java, D.E.I. Templestraat 3, Soerabaya, Java. Telegrams—Kodak, Soerabaya. 'Phone, Interlocaal.

Kodak (Australasia), Ltd., (incorporating Baker and Rouse Proprietary, Ltd.), Melbourne. Telegrams—Kodak, Melbourne; Sydney, Adelaide, Brisbane, Toowoomba, Townsville, Rockhampton, Broken Hill and Hobart, Australia; Auckland, Dunedin, Christchurch and Wellington, N.Z.

Kodak (East Africa), Ltd., Zebra House, P.O. Box 28, Nairobi. Branches:—Kenya Colony: Kitale, Eldaret, Nakura, Mombasa; Uganda: Kampala and Jinja; Tanganyika: Dar-es-Salaam, Arusha, Tahora.

Kodak (South Africa), Ltd., 38/40, Kodak House, Corner of Shortmarket and Loop Street, Cape Town. Telegrams—Kodak, Cape Town, Imperial Buildings, 7, Harvard Buildings, Joubert Street, National Mutual Buildings, Rissik Street, Johannesburg. Telegrams—Kodak, Johannesburg; 339, West Street, Durban. Telegrams—Kodak, Durban.

Kosmos Photographics, Ltd., Letchworth, Herts. 'Phone, 128. Telegrams—Kosmos, Letchworth · also 155, Victoria Street, London, S.W. 1. 'Phone, Victoria 2685.

Kuntzen, H., 33, White Lion Street, Bishopsgate, London, E. 1. 'Phone, Bishopsgate 1991. Telegrams—Gambadoes, Ald, London.

Lambert, L. W., Ltd., 166, Piccadilly, London, W. 1. 'Phone, Regent 3342.

Lancashire Ferrotype Co., 38, Central Drive, Blackpool.

Lancaster, J., & Son, Ltd., 87, Parade Birmingham. Telegrams—Lancaster,

Lansdowne, H. G., & Co., Golden Hillock Road, Birmingham. 'Phone, Victoria 1140.

Lea & Son, Oxygen Works, Runcorn, Cheshire. 'Phone 1, Telegrams—Lea, Oxygen, Runcorn.

Leitz, E. (London), 20, Mortimer Street, London, W. 1. 'Phone, Museum 9321. Telegrams—Microtome, Phone, London.

Lennon, Limited, 12 and 14, Lafone Street, Tower Bridge, London, S.E. 1, 'Phone, Hop 5594. Telegrams—Lenonibus, Boroh, London.

Lewis, C. & A. G., Ltd., 97-99, Sherwood Street, Nottingham. 'Phone, 40935 Telegrams—Lewis, Nottingham 40935

Lilywhite, Limited, Lumb Mills, Triangle, Yorks. 'Phone, Ripponden 72. Telegrams—Lilywhite, Triangle. London Office: 40/3, Fleet Street, E.C. 4. 'Phone, Central 6103. Telegrams—Lilwitelim, Fleet, London.

Lindenmeyer & Johnson Paper Co., Ltd. *See* Johnson, Fredk., & Co., Ltd.

Lizars, J., 101-107, Buchanan Street, Glasgow. 'Phone, Central 8062. 381 Sauchiehall Street, Glasgow. 'Phone, Douglas 1669. Telegrams—Lizars, Glasgow; Golden Acre Works, Craignestock Street, Glasgow; 6, Shandwick Place, Edinburgh. 'Phone, 22272. Telegrams—Optical, Edinburgh; 171, Union Street, Aberdeen. 'Phone, 2324. Telegrams—Lizars, Optician, Aberdeen; 71, Bold Street, Liverpool. 'Phone, Royal 1882. Telegrams—Lizars, Optician, Liverpool; 27, High Street, Paisley. 'Phone, 2238. Telegrams—Lizars, Optician, Paisley; 14, West Blackhall Street, Greenock. 'Phone, 877. Telegrams—Lizars, Optician, Greenock; 12, Muir Street, Motherwell. 'Phone, 68. Telegrams—Lizars, Opticians, Motherwell; 8, Wellington Place, Belfast. 'Phone, 1028. Telegrams—Lizars, Belfast.

Lockyer, J. E., Ltd., 244, Evelyn Street, Deptford, London, S.E. 8. 'Phone, New Cross 0596.

London Camera Exchange Co., Ltd., Portugal House, 2, Poultry, Cheapside, London, E.C. 2. 'Phone, Central 8691. Telegrams—Loncamerex, Stock, London.

L.C.C. School of Photo-Engraving and Lithography, Bolt Court, Fleet Street, London, E.C. 4. 'Phone, Central 4153.

Lord's Camera Works, Wardleworth, Rochdale. Telegrams—Camera Works, Rochdale.

Loveless & Hunter, 260, Tottenham Court Road, London, W. 1. 'Phone, Museum 0694. Telegrams—Reyderuk, Westcent, London.

Lowthime, D. A., & Co., 17 & 18, Paradise Street, Finsbury, London, E.C. 2. 'Phone, Clerkenwell 8006.

Lumex, Ltd., Dame Lane, Dublin. 'Phone, Dublin 4310. Telegrams—Lumex, 4310 Dublin.

Luxol Safety Light Co., Ltd., 57, Southwark Street, London, S.E. 1. 'Phone, Hop 0908.

Mackenzie and Co., 212, Old Dumbarton Road, Glasgow. 'Phone, Western 613. Telegrams—Daylight, Glasgow.

Macleod, Angus M., 5, Greenhill Road, Harlesden, London, N.W. 10. 'Phone, Willesden 3071.

Maling, C. T., & Son, Ford Potteries, Newcastle-on-Tyne. 'Phone, Central 6193, 6194. Telegrams—Maling, Newcastle-on-Tyne.

Mander, Elisha, Ltd., 29-35, Branston Street, Birmingham. 'Phone, Central 2706. Telegrams—Miniature, Birmingham, 8-9, Great Pulteney Street, London, W. 1. 'Phone, Gerrard 7246.

Manistre, H. E., 113, Queen's Road, London, W. 2. 'Phone, Park 3636.

Marion & Foulger, Ltd., Magna Works, London Road, Bedford. 'Phone, Bedford 3261. Telegrams—Bedford 3261.

Marshall & Co., Ford Street, Nottingham Road, Nottingham. 'Phone, 75386. Telegrams—Marshall, Photo, Nottingham.

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Mather, E., & Co., Ltd., 7, Victoria Bridge, Manchester. 'Phone, Blackfriars 6133.

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Mawson & Swan, Ltd., 13, Mosley Street, Newcastle-on-Tyne. 'Phone, Central 1470. Telegrams—Mands, Newcastle-on-Tyne.

May & Baker, Ltd., 39-43, High Street, Battersea, London, S.W. 11. 'Phone, Battersea 1813. Telegrams—Bismuth, Battsquare, London.

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McIntosh, Wm. (Rotherham), Ltd., Imperial Buildings, Rotherham, Yorks. 'Phone, Rotherham 223.

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Newman & Guardia, Ltd., 17-18, Rathbone Place, Oxford Street, London, W. 1. 'Phone, Museum 1081. Telegrams—Goniometer, Westcent, London.

Newman & Sinclair, Ltd., 2, Salisbury Road, Highgate, London, N. 19. 'Phone, Mountview 1013. Telegrams—Oraculum, Westrand, London.

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Ogilvy & Co., 20, Mortimer Street, London, W. 1. 'Phone, Museum 3406. Telegrams—Microtome, Phone, London.

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Ross, Ltd., 13/14, Great Castle Street, Oxford Circus, London, W. 1. 'Phone, Langham 2240. Telegrams—Rossano Wesdo, London; Works, 3, North Side, Clapham Common, London, S.W. 4. 'Phone, Battersea 3876 & 3877. Telegrams—Rossicaste, 'Phone, London.

Roth, A. O., 85, Ringstead Road, Catford, London, S.E. 6. 'Phone, Lee Green 2424. Telegrams—Mentorflex, Catgreen, London.

Royal Photographic Society, 35, Russell Square, London, W. 1 'Phone, Museum 0411.

Royal Sovereign Pencil Co., Ltd., Britannia Works. Neasden, London, N.W. 10. 'Phone, Willesden 2407-8. Telegrams—Omnimodus London.

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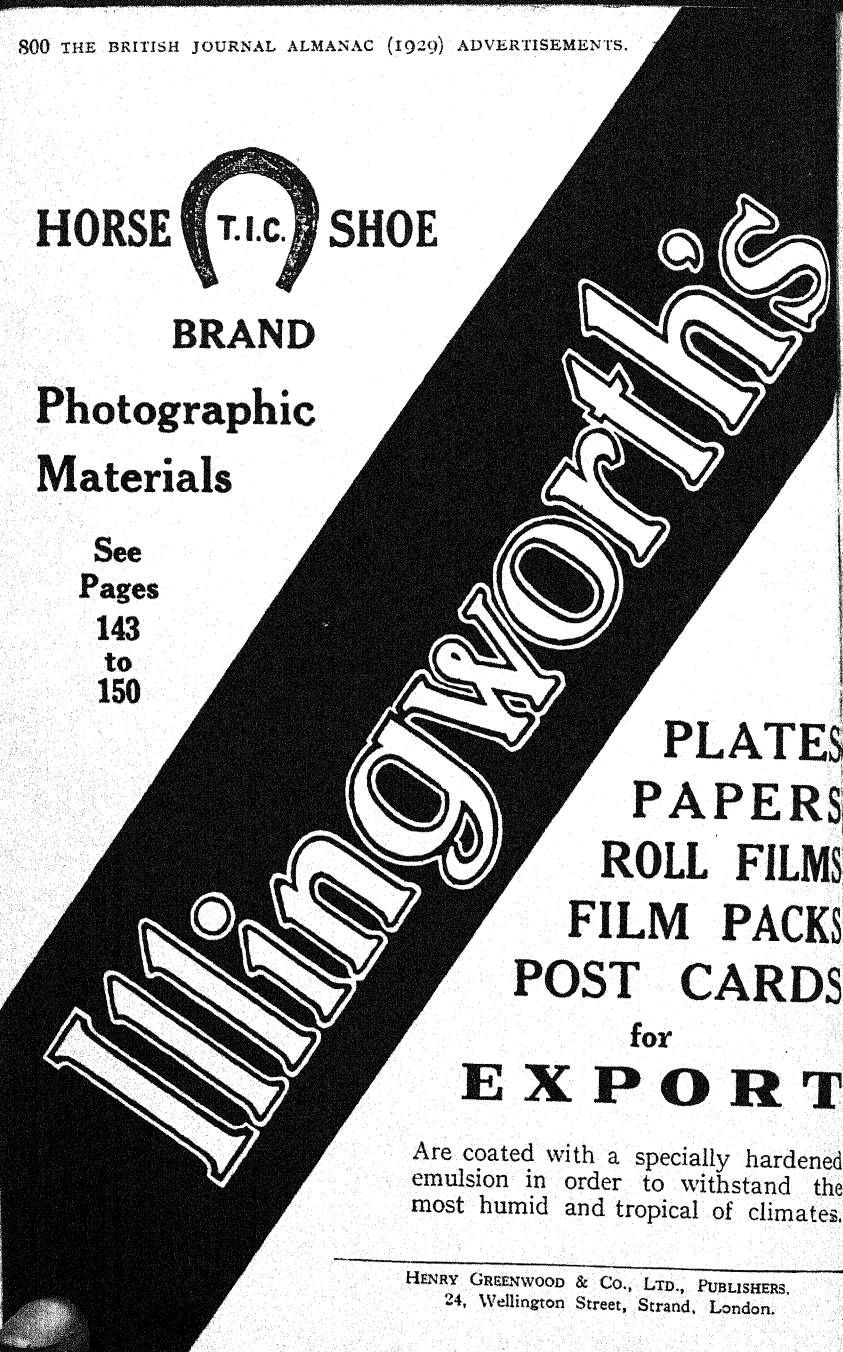
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